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Operability and Location of Michigan's Timber Resource

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OPERABILITY AND LOCATION OF MICHIGAN'S TIMBER RESOURCE

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Michigan's 17.5 million acres of timberland in 1980 supported 19.1 billion cubic feet of growing stock (Raile and Smith 1983). Some of this material is unavailable to potential timber purchasers because landowners do not presently wish to sell their timber. Additional volume may be unavailable for harvesting or management due to operability. We define operability as the ease or difficulty of managing or harvesting timber because of physical conditions in the stand or on the site. Operability problems include small average tree size, fragile soils, poor drainage, inaccessibility, and small tract size, among others.

The purpose of this paper is to present the results of our analysis of the operability of Michigan's timberland. The methods we used to assess operability are similar to those used by Spencer *et al.* (1986) in Minnesota. Because the approaches are similar, users can compare data from these two States as well as Wisconsin, which is currently being analyzed using methods identical to those used here. A detailed description of these methods is presented by Spencer *et al.* (1986); therefore, we will give only a brief summary here.

Statewide inventory information was provided by Forest Inventory and Analysis (FIA) permanent sample plots. Although some subjectivity was involved in assigning values to operability components, the use of FIA data favors objectivity for calculating areas and volumes by operability classes. Users of this information can also mitigate some of this subjectivity by tailoring the results to more closely fit their own requirements. Up to three of the seven operability characteristics used to stratify areas into operability classes may be eliminated, and the remaining characteristics—those deemed important to the user—may be used alone to estimate operability class.

METHODS

Information used to define the operability class components was selected from tree and stand data collected during the 1980 State inventory.[1] Operability classes for Michigan's timberland were based on seven components—stand area, growing-stock volume per acre, sawtimber volume per acre, percent of cull trees in the stand, average diameter at breast height (d.b.h.) of growing-stock trees, merchantable height of growing-stock trees, and distance to a maintained[2] road from the stand (table 1). These seven major operability components were the factors identified by the public and private forestry sectors as most important in determining operability. Operability classifications I, II, or III (good, medium, or poor) also were defined for each component (table 1). The overall operability classification of any area is based on the poorest operability component.

The seven operability components were the same used by Spencer *et al.* (1986) in Minnesota. These components and associated values were selected after a great deal of correspondence with and review by professionals involved in both public and private sector

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[1] *Areas and volumes presented in this report do not exactly match those published in other resource reports published by North Central Forest Experiment Station. For example, Raile and Smith (1983) reported the area of timberland to be 17,489.5 thousand acres; here, we report a timberland area of 17,489.8 thousand acres. These minor differences are due to slight procedural changes in data processing used to compute operability information from those methods used in 1980.*

[2] *See Definitions of Terms in Appendix.*

Table 1.—*Operability component values for each operability class*

Operability component	Operability class		
	I (Good)	II (Medium)	III (Poor)
1. Stand area (in acres)	More than 60	10-60	Less than 10
2. Growing-stock volume per acre (in cubic feet)[1]	More than 1,000	400-1,000	Less than 400
3. Sawtimber volume per acre (in board feet, International 1/4-inch rule)[2]	More than 2,500	700-2,500	Less than 700
4. Percent of all live trees that are cull (in percent)	Less than 20	20-50	More than 50
5. Average diameter at breast height (d.b.h.) of growing-stock trees (in inches)[3]	More than 9	6-9	Less than 6
6 Average merchantable height of growing-stock trees (in feet)	More than 28	16-28	Less than 16
7. Distance to a maintained road (in miles)	Less than 1/4	1/4 - 3/4	More than 3/4

[1] Threshold values for growing stock volume per acre used in the Minnesota study (Spencer *et al.* 1986) were "more than 800," "300 to 800," and "less than 300" cubic feet per acre.

[2] Threshold values for sawtimber volume per acre used in the Minnesota study (Spencer *et al.* 1986) were "more than 3,000," "1,100 to 2,000," and "less than 1,100" board feet per acre.

[3] Threshold values for average d.b.h. of growing-stock trees used in the Minnesota study (Spencer *et al.* 1986) were "more than 10," "6-10," and "less than 6" inches.

forest management and timber acquisition in the Lake States region. After the Minnesota operability study was published, identical tables for Michigan were produced and reviewed by public and private forestry professionals. These reviewers saw a need to change some of the threshold levels (values used to define good, medium, or poor operability classes) from those used in Minnesota (changes are shown in the footnotes of table 1). The thresholds were changed to reflect as nearly as possible what those currently harvesting timber in Michigan consider are good, medium, or poor operability stands.

In order for an inventory plot to be rated class I (good), *all* of the values for the seven components on the plot had to be class I. A plot was rated class II (medium) if the values for the seven components on the plot were either class I or II. A plot was rated operability class III (poor) if *any* of the component values were class III (e.g., if the values for six components on a plot were class I and the value for the remaining component was class III, the plot was considered operability class III). All sapling-seedling and nonstocked plots were considered inoperable (class IV); we believe that most of this land would not be harvested in the near future and that including it in the study would only dilute the findings.

Some operability class components might not be considered important by some users. To permit these users to develop classes containing only those components of concern to them, we developed tables 8 and 9 (Appendix) showing area of timberland in operability classes II and III by limiting factor. We also developed similar tables for growing-stock volume (tables 16 and 17).

A limiting factor represents the operability class component or components that prevents the plot from being classed higher. The limiting factor tables for class II show the individual components that were rated class II and, therefore, caused the area or volume to be rated class II rather than class I. Limiting factor tables for class III show the same information. The limiting factor tables permit the reader to find the area or volume on plots called operability class II or III because of components they consider unimportant. These areas or plot volumes then can be added to those listed as operability class I or II to produce revised estimates.

We identified 15 current major wood-using centers in Michigan: Alpena, Brighton, Cadillac, Escanaba, Filer City, Gaylord-Grayling, Iron Mountain, L'Anse, Manistique, Midland, Muskegon, Newberry, Ontona-

gon, Otsego, and West Branch. The straight-line distance of each plot to these cities was recorded. The area and volume represented by each plot could be related to its distance from each city. These plot areas and volumes were summed and stratified by operability class to estimate the area of timberland (table 13) and volume of growing stock (table 21) by distance from each of the 15 wood-using centers.

RESULTS

Area

Using the method outlined above, 7.0 million acres (40 percent of the total) of timberland in Michigan are rated operability class III—poor (table 7). Another 5.8 million acres (33 percent) are rated class II—medium, and only 100,900 acres (less than 1 percent) are rated class I—good. Class IV forest, sapling-seedling stands and nonstocked areas, total 4.6 million acres (26 percent); this class will not be discussed further. Of the 14 forest types identified in Michigan, only 7 have any area in operability class I (table 7).

Adjustment by Limiting Factors

Using the method of limiting factors described earlier, forest areas can be shifted towards the good operability class (class I). For example, the 100.9 thousand acres originally rated operability class I can be increased to 519.7 thousand acres (100.9 + 418.8 thousand acres from tables 7 and 8) by waiving the stand area component (operability component 1). Alternatively, the total area in class I can be increased to 347.0 thousand acres (100.9 + 246.1 thousand acres) by removing the constraint on distance to road (operability component 7). By waiving both components, the new class I area becomes 1,316.8 thousand acres (100.9 + 418.8 + 246.1 + 551.0 thousand acres). Although the resulting 1,316.8 thousand acres is 13 times larger than the original class I area, it still represents only 10 percent of the State's total for classes I-III. This suggests, too, that the physical standards for some operability components may be too confining, or that the definitions of operability classes could be modified further to meet individual user needs. However, new standards should reflect actual conditions and should *not* be developed only to achieve a more equal distribution of the resource among operability classes.

Volume Per Acre

As expected, higher volumes per acre are associated with the better operability classes (table 2). All of the class I land, 79 percent of class II land, and 61 percent of class III land have more than 1,000 cubic feet of growing-stock volume per acre.

Table 2.—*Percent of timberland (excluding sapling-seedling stands and nonstocked areas) by growing-stock volume and operability class, Michigan, 1980*

(In percent)

Growing-stock volume per acre (cu.ft./acre)	Operability class		
	I	II	III
More than 1,000	100	79	61
400-1,000	—	21	34
Less than 400	—	—	5
Total	100	100	100

Ownership

The proportion of timberland in each operability class differs greatly among ownership classes (table 3). Farmers and other miscellaneous private owners, who together own more than half the timberland in Michigan, own the highest percentages of timberland in operability classes I and II. This timberland tends to be accessible by road in Michigan and to receive less forest management (especially harvesting) than timberland owned by the public or forest industry. Timberland owned by the public or forest industry is managed more intensely than private timberland and may be predisposed to higher operability ratings.

Distance from Wood-using Center

If sapling-seedling stands and nonstocked areas are ignored, 540 thousand acres of timberland are within 20 miles (straight-line distance) of L'Anse, Michigan. L'Anse had the largest concentration of operable timberland of the 15 major wood-using centers in the State. Newberry, Michigan, had 429 thousand acres and Gaylord-Grayling had 377 thousand acres within 20 miles. If the timbershed is extended to a radius of

Table 3.—*Percent of timberland (excluding sapling-seedling stands and nonstocked areas) by major ownership class and operability class, Michigan, 1980*

(In percent)

Ownership class	Operability class			
	All classes	I	II	III
Farmer	100	2	49	49
Misc. private	100	1	48	51
Forest industry	100	1	43	56
State	100	0	45	55
Co. and municipal	100	0	37	63
National Forest	100	0	33	67
All owners	100	1	45	54

50 miles, L'Anse is still first with 2,553 thousand acres, followed by Gaylord-Grayling (2,080 thousand) and Cadillac (1,905 thousand).

If, however, operability is factored into the consideration of distance from wood-using center, a different picture emerges. Brighton, Michigan, becomes the leader: it has 6,800 acres in operability class I timberland within 20 miles of town. However, because this is such a small area, as is the entire class I area, it makes more sense to expand the discussion to operability classes I and II.

If operability class I and II land within 20 miles of major wood-using centers is considered, L'Anse (305 thousand acres), Cadillac (193 thousand acres), and Gaylord-Grayling (189 thousand acres) lead the list. Analysts, then, can use table 13 to estimate the difficulty of managing or harvesting timber within 3 different radii from 15 different wood-using centers in the State.

Volume

Growing-stock volume on timberland in Michigan was stratified into operability classes, just as was the area of timberland. Because the same kind of tables were generated for volume that were discussed for area above, only the highlights are discussed.

Michigan's 1980 growing-stock inventory of 17.6 billion cubic feet is broken down into operability classes as follows:

Operability class	Growing-stock volume	
	Million cubic feet	*Percent*
I	182	1
II	8,724	50
III	8,702	49
All classes	17,608	100

The maple-birch type, which represents 43 percent of the combined volumes in classes I through III, includes 49 percent of the operability class I volume (table 15), reflecting the bias of the components towards larger, older trees.

Adjustment by Limiting Factors

Volumes can be adjusted to suit the needs of the user the same way area can be adjusted, as discussed earlier. Waiving the same two operability components as in the area discussion (stand area and distance to road) changes the volume in operability class I from 182 to 2,482 million cubic feet (tables 15 and 16). Likewise, the volume in operability class II shifts from 8,724 to 13,665 million cubic feet and that in class III declines from 8,702 to 1,460 million cubic feet (tables 15 and 17). Percentages in each class then become:

Operability class	Volume
	Percent
I	14
II	78
III	8
All classes	100

Volume Per Acre

Average volume per acre differed somewhat by operability class and volume per acre class, but it generally is highest in the best operability classes (table 4).

Ownership

The largest proportion of growing-stock volume—like area, discussed earlier—in operability classes I and II is on farmer and other miscellaneous privately owned timberland (table 5).

Distance from Wood-using Center

L'Anse is within 20 miles of 507 million cubic feet of operability class I and II growing stock—more than any other wood-using center in the State. Gaylord-Grayling and Cadillac follow with 294 and 292 million cubic feet, respectively (table 21). The same cities are in the same order if the radius is extended to 50 miles.

SUMMARY

The tables provided in this report permit timberland and growing-stock volume to be separated into operability classes by forest type, volume per acre class, stand-age class, ownership class, and distance from wood-using center. In addition, the tables permit up to three operability components to be discounted and operability class to be determined based on the remaining relevant components.

Table 4.—*Average growing-stock volume per acre on timberland by volume and operability class, Michigan, 1980*

(In cubic feet per acre)

Volume per acre class	Operability class			
	Average all classes	I	II	III
More than 1,000	1,658	1,804	1,708	1,602
400-1,000	754	—	802	730
Less than 400	291	—	—	291

Table 5.—*Percent of growing-stock volume*[1] *by ownership class and operability class, Michigan, 1980*
(In percent)

Ownership class	Operability class			
	All classes	I	II	III
Farmer	100	3	54	43
Misc. private	100	1	54	45
State	100	[2]	50	49
Forest industry	100	1	45	54
Co. and municipal	100	—	42	58
National Forest	100	—	36	64
All owners	100	1	50	49

[1] Excludes growing-stock volume in sapling-seedling stands and on nonstocked areas.
[2] Less than 0.5 percent.

LITERATURE CITED

Raile, Gerhard K.; Smith, W. Brad. 1983. Michigan forest statistics, 1980. Resour. Bull. NC-67. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 101 p.

Spencer, John S. Jr.; Hansen, Mark H.; Jakes, Pamela J. 1986. A method for estimating operability and location of the timber resource. Res. Pap. NC-273. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 52 p.

APPENDIX

PRINCIPAL TREE SPECIES GROUPS IN MICHIGAN[3]

Softwoods
- Eastern white pine ..... *Pinus strobus*
- Red pine ..... *Pinus resinosa*
- Jack pine ..... *Pinus banksiana*
- White spruce ..... *Picea glauca*
- Black spruce ..... *Picea mariana*
- Balsam fir ..... *Abies balsamea*
- Eastern hemlock ..... *Tsuga canadensis*
- Tamarack ..... *Larix laricina*
- Northern white-cedar ..... *Thuja occidentalis*
- Other softwoods
  - Eastern redcedar ..... *Juniperus virginiana*
  - Norway spruce ..... *Picea abies*
  - Engelmann spruce ..... *Picea engelmannii*
  - Austrian pine ..... *Pinus nigra*
  - Scotch pine ..... *Pinus sylvestris*

Hardwoods
- White oaks
  - White oak ..... *Quercus alba*
  - Swamp white oak ..... *Quercus bicolor*
  - Bur oak ..... *Quercus macrocarpa*
  - Chinkapin oak ..... *Quercus muehlenbergii*
  - Chestnut oak ..... *Quercus prinus*
- Select red oak
  - Northern red oak ..... *Quercus rubra*
- Other red oaks
  - Scarlet oak ..... *Quercus coccinea*
  - Northern pin oak ..... *Quercus ellipsoidalis*
  - Pin oak ..... *Quercus palustris*
  - Black oak ..... *Quercus velutina*
- Hickories
  - Bitternut hickory ..... *Carya cordiformis*
  - Pignut hickory ..... *Carya glabra*
  - Shellbark hickory ..... *Carya laciniosa*
  - Shagbark hickory ..... *Carya ovata*
  - Mockernut hickory ..... *Carya tomentosa*
- Yellow birch ..... *Betula alleghaniensis*
- Hard maples
  - Sugar maple ..... *Acer saccharum*
  - Black maple ..... *Acer nigrum*
- Soft maples
  - Red maple ..... *Acer rubrum*
  - Silver maple ..... *Acer saccharinum*
- American beech ..... *Fagus grandifolia*
- Ashes
  - White ash ..... *Fraxinus americana*
  - Black ash ..... *Fraxinus nigra*
  - Green ash ..... *Fraxinus pennsylvanica*
- Balsam poplar ..... *Populus balsamifera*
- Eastern cottonwood ..... *Populus deltoides*
- Aspens
  - Bigtooth aspen ..... *Populus grandidentata*
  - Quaking aspen ..... *Populus tremuloides*
- Basswood ..... *Tilia americana*
- Yellow-poplar ..... *Liriodendron tulipifera*
- Black walnut ..... *Juglans nigra*
- Black cherry ..... *Prunus serotina*
- Butternut ..... *Juglans cinerea*

[3] *The common and scientific names are based on: Little, Elbert D. 1979. Checklist of native and naturalized trees of the United States. Agric. Handb. 541. Washington, DC: U.S. Department of Agriculture, Forest Service. 375 p.*

Elms
- American elm ..... *Ulmus americana*
- Slippery elm ..... *Ulmus rubra*
- Rock elm ..... *Ulmus thomasii*

Paper birch ..... *Betula papyrifera*

Other hardwoods
- Boxelder ..... *Acer negundo*
- Sweet birch ..... *Betula lenta*
- River birch ..... *Betula nigra*
- Black willow ..... *Salix nigra*
- Ohio buckeye ..... *Aesculus glabra*
- Flowering dogwood ..... *Cornus florida*
- Honeylocust ..... *Gleditsia triacanthos*
- Osage-orange ..... *Maclura pomifera*
- Black tupelo ..... *Nyssa sylvatica* var. *sylvatica*
- Sycamore ..... *Platanus occidentalis*
- Black locust ..... *Robinia pseudoacacia*
- Sassafras ..... *Sassafras albidum*
- Red mulberry ..... *Morus rubra*
- American chestnut ..... *Castanea dentata*

Metric Equivalents of Units Used in this Report

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares.
1 cubic foot = 0.0283 cubic meter.
1 mile = 1.61 kilometers.
1 foot = 30.48 centimeters or 0.3048 meter.
1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.

Universal Transverse Mercator (UTM) Grid System

The UTM Grid system is designed for world use between 80° south latitude and 84° north latitude. The globe is divided into narrow zones of 6° of longitude in width, numbered 1 through 60. Each zone is bounded on the east and west by a meridian of longitude and with a central meridian passing through the center of the grid zone. In the northern hemisphere the intersection of the central meridian and the equator is given a value of 0 meters for northing coordinate, and the numbers increase towards the north pole. Because values increase from west to east, this same point of intersection is given a value of 500,000 meters for easting coordinate to avoid negative numbers at the west edge of the zone. A grid system of two sets of parallel lines intersecting at right angles and forming a series of squares is established within each grid zone. On the U.S. Geological Survey 7.5 minute topographic maps, the grid interval or length of each side of these squares is 1,000 meters. Each grid intersection can be uniquely identified by its easting and northing and the zone number. The first of these coordinates represents the distance in meters east of the central meridian of the grid zone and the second coordinate represents the distance in meters north of the equator. Any point on a topographic map can be referenced by using these coordinates and by dividing the sides of the grid square into 10 or multiples of 10 parts. The point coordinates, then, are read to a greater number of digits than the grid coordinates. Such a system permits a point to be located to the nearest 10 meters. If the UTM coordinates of any two points are known, it is a straightforward process to compute the distance between them, even if they are in different zones.

DEFINITION OF TERMS

Commercial forest land.—(See timberland.)

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam and hawthorn.)

County and municipal land.—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Farm.—Any place from which $1,000 or more of agricultural products were produced and sold during the year.

Farmer-owned land.—Land owned by farm operators. (Note: Excludes land leased by farm operators from nonfarm owners, such as railroad companies and States.)

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. Also see definition for timberland.

Forest industry land.—Land owned by companies or individuals operating primary wood-using plants.

Forest trees.—Woody plants having a well-developed stem and usually more than 12 feet tall at maturity.

Forest type.—A classification of forest land based upon the species forming a plurality of live tree stocking. Major forest types in Michigan are:

Jack pine.—Forests in which jack pine comprises

a plurality of the stocking. (Common associates include eastern white pine, red pine, aspen, birch, and maple.)

Red pine.—Forests in which red pine comprises a plurality of the stocking. (Common associates include eastern white pine, jack pine, aspen, birch, and maple.)

White pine.—Forests in which eastern white pine comprises a plurality of the stocking. (Common associates include red pine, jack pine, aspen, birch, and maple.)

Balsam fir.—Forests in which balsam fir and white spruce comprise a plurality of stocking with balsam fir the most common. (Common associates include aspen, maple, birch, northern white-cedar, and tamarack.)

White spruce.—Forests in which white spruce and balsam fir comprise a plurality of the stocking with white spruce the most common. (Common associates include aspen, maple, birch, northern white-cedar, and tamarack.)

Black spruce.—Forests in which swamp conifers comprise a plurality of the stocking with black spruce the most common. (Common associates include tamarack and northern white-cedar.)

Northern white-cedar.—Forests in which swamp conifers comprise a plurality of the stocking with northern white-cedar the most common. (Common associates include tamarack and black spruce.)

Tamarack.—Forests in which swamp conifers comprise a plurality of the stocking with tamarack the most common. (Common associates include black spruce and northern white-cedar.)

Oak-hickory.—Forests in which northern red oak, white oak, bur oak, or hickories, singly or in combination, comprise a plurality of the stocking. (Common associates include jack pine, beech, yellow-poplar, elm, and maple.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, cottonwood, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include birches, spruce, and balsam fir.)

Maple-birch.—Forests in which sugar maple, basswood, yellow birch, upland American elm, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include white pine, elm, hemlock, and basswood.)

Aspen.—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. (Common associates include balsam poplar, balsam fir, and paper birch.)

Paper birch.—Forests in which paper birch comprises a plurality of the stocking. (Common associates include maple, aspen, and balsam fir.)

Exotic.—Forests in which species not native to Michigan comprise a plurality of the stocking. (Mostly scotch pine plantations.)

Growing-stock trees.—Live trees of commercial species qualifying as desirable and acceptable trees. (Note: Excludes rough and rotten trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5 inches d.b.h. and over, from a 1-foot stump to a minimum 4 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs. Cubic feet can be converted to standard cords by dividing by 79. One standard cord is 128 cubic feet of stacked wood, including bark and air.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Indian land.—All land held in trust by the United States for individual Indians or tribes, or all lands, titles to which are held by individual Indians or tribes, subject to Federal restrictions against alienation.

Live trees.—Growing-stock, rough, and rotten trees 1 inch d.b.h. and larger.

Maintained road.—Any road, hard-topped or other surface, that is plowed or graded at least once a year. Includes rights-of-way that are cut or treated to limit herbaceous growth.

Miscellaneous Federal land.—Federal land other than National Forest and land administered by the Bureau of Land Management.

Miscellaneous private land.—Privately owned land other than forest-industry and farmer-owned land.

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land administered by the USDA Forest Service.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonstocked land.—Timberland less than 16.7 percent stocked with growing-stock trees.

Poletimber trees.—Growing-stock trees of commercial species at least 5 inches d.b.h. but smaller than sawtimber size.

Saplings.—Live trees 1 to 5 inches d.b.h.

Sapling-seedling stands.—(See stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7 inches (9 inches for hardwoods) or other combinations of size and defect specified by regional standards.

Saw log portion.—That part of the bole of sawtimber trees between the stump and the saw log top.

Saw log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw log top is 7 inches d.o.b. for softwoods and 9 inches d.o.b. for hardwoods.

Sawtimber stands.—(See stand-size class.)

Sawtimber trees.—Growing-stock trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer and meeting regional specifications for freedom from defect. Softwoods must be at least 9 inches d.b.h. Hardwoods must be at least 11 inches d.b.h.

Sawtimber volume.—Net volume of the saw log portion of live sawtimber in board feet, International ¼-inch rule, from stump to a minimum 7 inches top diameter outside bark (d.o.b.) for softwoods and a minimum 9 inches top d.o.b. for hardwoods.

Seedlings.—Live trees less than 1 inch d.b.h. that are expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Stand.—A growth of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-size class.—A classification of forest land based on the size class of growing-stock trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

a. *Sawtimber stands.*—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

b. *Poletimber stands.*—Stands at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

c. *Sapling-seedling stands.*—Stands at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and/or seedlings.

d. *Nonstocked areas.*—Timberland on which stocking of growing-stock trees is less than 16.7 percent.

State land.—Land owned either by States or leased to them for 50 years or more.

Timberland.—(Formerly called commercial forest land.) Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization. (Note: Areas qualifying as timberland are capable of producing more than 20 cubic feet per acre per year of annual growth when managed. Currently inaccessible and inoperable areas are included except when the areas involved are small and unlikely to become suitable for producing industrial wood in the foreseeable future.)

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(In thousand acres)

Operability class component	Forest type								
	All types	Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack
Stand area (acres)									
More than 60	3,658.4	151.1	79.3	26.0	93.7	21.9	96.1	387.1	27.3
10-60	6,529.8	269.5	270.4	80.2	171.7	31.5	80.8	322.9	22.1
Less than 10	7,301.6	415.8	306.8	107.9	370.2	46.5	343.0	463.7	65.4
All classes	17,489.8	836.4	656.5	214.1	635.6	99.9	519.9	1,173.7	114.8
Growing-stock volume (cubic feet/acre)									
More than 1000	8,972.0	205.7	320.8	135.5	297.2	54.9	127.3	683.7	7.9
400-1000	5,224.4	408.8	194.6	49.1	231.8	27.8	226.1	348.7	43.7
Less than 400	3,293.4	221.9	141.1	29.5	106.6	17.2	166.5	141.3	63.2
All classes	17,489.8	836.4	656.5	214.1	635.6	99.9	519.9	1,173.7	114.8
Sawtimber volume (board feet/acre)									
More than 2500	6,922.1	200.5	222.9	141.3	239.7	43.5	52.8	401.0	5.4
700-2500	5,750.5	347.3	169.4	49.9	234.6	26.3	198.7	450.7	40.4
Less than 700	4,817.2	288.6	264.2	22.9	161.3	30.1	268.4	322.0	69.0
All classes	17,489.8	836.4	656.5	214.1	635.6	99.9	519.9	1,173.7	114.8
Percent cull trees (percent)									
Less than 20	13,768.9	700.9	531.9	172.9	515.0	83.1	446.4	909.3	92.4
20-50	2,534.7	82.7	46.3	34.5	110.9	9.8	42.5	222.5	9.7
More than 50	1,186.2	52.8	78.3	6.7	9.7	7.0	31.0	41.9	12.7
All classes	17,489.8	836.4	656.5	214.1	635.6	99.9	519.9	1,173.7	114.8
Average d.b.h. of growing-stock trees (inches)									
More than 9	4,717.9	132.8	99.6	115.4	78.6	14.3	11.2	104.3	9.0
6-9	11,484.5	634.0	416.9	98.7	523.8	71.1	410.5	973.9	75.6
Less than 6	1,287.4	69.6	140.0	--	33.2	14.5	98.2	95.5	30.2
All classes	17,489.8	836.4	656.5	214.1	635.6	99.9	519.9	1,173.7	114.8
Average merchantable height of growing-stock trees (feet)									
More than 28	11,519.0	318.6	280.7	164.4	306.0	53.0	146.7	149.3	29.2
16-28	5,113.3	480.3	300.1	49.7	313.3	39.9	335.2	959.9	76.2
Less than 16	857.5	37.5	75.7	--	16.3	7.0	38.0	64.5	9.4
All classes	17,489.8	836.4	656.5	214.1	635.6	99.9	519.9	1,173.7	114.8
Distance to road (miles)									
Less than 1/4	6,818.6	365.0	291.8	95.1	192.4	42.2	89.6	306.2	38.9
1/4-3/4	8,171.6	347.3	317.3	76.6	299.8	42.6	221.5	604.9	43.6
More than 3/4	2,499.6	124.1	47.4	42.4	143.4	15.1	208.8	262.6	32.3
All classes	17,489.8	836.4	656.5	214.1	635.6	99.9	519.9	1,173.7	114.8

(Table 6 continued on next page)

(Table 6 continued)

Operability class component	Forest type						
	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
Stand area (acres)							
More than 60	285.9	260.2	1,435.6	690.8	59.0	8.5	35.9
10-60	887.5	436.2	2,480.1	1,276.0	133.4	41.4	26.1
Less than 10	599.1	631.1	2,182.8	1,438.8	183.1	36.4	111.0
All classes	1,772.5	1,327.5	6,098.5	3,405.6	375.5	86.3	173.0
Growing-stock volume (cubic feet/acre)							
More than 1000	929.4	545.2	4,091.8	1,329.7	231.9	11.0	--
400-1000	594.0	447.2	1,392.4	1,133.9	98.9	27.4	--
Less than 400	249.1	335.1	614.3	942.0	44.7	47.9	173.0
All classes	1,772.5	1,327.5	6,098.5	3,405.6	375.5	86.3	173.0
Sawtimber volume (board feet/acre)							
More than 2500	791.2	453.6	3,450.6	841.5	73.2	4.9	--
700-2500	630.8	491.5	1,748.9	1,164.1	183.4	12.9	1.6
Less than 700	350.5	382.4	899.0	1,400.0	118.9	68.5	171.4
All classes	1,772.5	1,327.5	6,098.5	3,405.6	375.5	86.3	173.0
Percent cull trees (percent)							
Less than 20	1,525.3	1,000.2	4,750.4	2,651.9	315.2	54.5	19.5
20-50	151.8	224.2	1,059.5	468.1	46.2	14.0	12.0
More than 50	95.4	103.1	288.6	285.6	14.1	17.8	141.5
All classes	1,772.5	1,327.5	6,098.5	3,405.6	375.5	86.3	173.0
Average d.b.h. of growing-stock trees (inches)							
More than 9	775.8	413.4	2,187.5	727.9	31.3	8.3	8.5
6-9	944.1	831.0	3,751.9	2,363.2	326.8	36.3	26.7
Less than 6	52.6	83.1	159.1	314.5	17.4	41.7	137.8
All classes	1,772.5	1,327.5	6,098.5	3,405.6	375.5	86.3	173.0
Average merchantable height of growing-stock trees (feet)							
More than 28	1,356.7	884.3	5,095.4	2,445.9	262.7	12.0	14.1
16-28	366.4	374.3	886.1	748.5	102.7	56.9	23.8
Less than 16	49.4	68.9	117.0	211.2	10.1	17.4	135.1
All classes	1,772.5	1,327.5	6,098.5	3,405.6	375.5	86.3	173.0
Distance to road (miles)							
Less than 1/4	825.9	586.8	2,328.2	1,386.1	123.9	73.8	72.7
1/4-3/4	854.0	631.9	2,860.1	1,603.6	181.4	12.5	74.5
More than 3/4	92.6	108.8	910.2	415.9	70.2	--	25.8
All classes	1,772.5	1,327.5	6,098.5	3,405.6	375.5	86.3	173.0

Table 7.--Area of timberland by forest type and operability class, Michigan, 1980

(In thousand acres)

Forest type	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack pine	836.4	2.5	173.4	442.6	217.9
Red pine	656.5	1.2	168.1	300.1	187.1
White pine	214.1	2.5	74.2	111.3	26.1
Balsam fir	635.6	--	140.4	318.7	176.5
White spruce	99.9	--	23.6	49.4	26.9
Black spruce	519.9	--	28.4	246.1	245.4
Northern white-cedar	1,173.7	3.7	326.3	616.7	227.0
Tamarack	114.8	--	7.5	40.5	66.8
Oak-hickory	1,772.5	28.5	828.7	608.1	307.2
Elm-ash-soft maple	1,327.5	--	415.8	509.0	402.7
Maple-birch	6,098.5	48.7	2,545.4	2,453.9	1,050.5
Aspen	3,405.6	13.8	921.1	1,103.5	1,367.2
Paper birch	375.5	--	95.0	210.8	69.7
Exotic	86.3	--	6.0	34.1	46.2
Nonstocked	173.0	--	--	--	173.0
All types	17,489.8	100.9	5,753.9	7,044.8	4,590.2

Table 8.--Area of timberland in operability class II (medium) by limiting factor and forest type, Michigan, 1980

(In thousand acres)

Limiting factor	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack
1	418.8	3.2	--	21.7	--	--	1.6	6.1	--
2	6.2	--	--	--	--	--	--	--	--
3	3.0	--	--	--	--	--	--	--	--
4	14.6	--	--	--	--	1.5	--	--	--
5	161.8	7.5	4.1	1.5	--	1.5	--	1.5	--
6	--	--	--	--	--	--	--	--	--
7	246.1	--	3.5	1.5	--	--	--	1.4	--
1 & 2	38.5	4.6	2.6	--	--	--	--	--	--
1 & 3	8.0	--	--	--	--	--	--	--	--
1 & 4	75.8	1.5	2.0	--	--	--	--	--	--
1 & 5	426.5	20.9	19.7	9.0	16.3	--	--	1.6	--
1 & 6	1.5	--	--	--	--	--	--	1.5	--
1 & 7	551.0	1.7	4.9	12.0	4.9	1.7	--	2.9	--
2 & 3	11.7	1.4	--	--	--	--	--	--	--
2 & 4	2.3	--	2.3	--	--	--	--	--	--
2 & 5	3.8	--	--	--	--	--	--	--	--
2 & 6	1.4	--	--	--	--	--	--	--	--
2 & 7	33.6	--	4.7	--	--	--	--	1.8	--
3 & 4	--	--	--	--	--	--	--	--	--
3 & 5	114.1	2.6	--	--	--	--	--	--	1.6
3 & 6	--	--	--	--	--	--	--	--	--
3 & 7	8.3	--	--	--	--	--	--	--	--
4 & 5	9.2	--	--	--	--	--	--	--	--
4 & 6	--	--	--	--	--	--	--	--	--
4 & 7	43.3	--	--	--	--	--	--	--	--
5 & 6	21.1	--	3.8	--	1.5	--	--	7.2	--
5 & 7	283.7	4.2	8.6	2.9	7.5	3.0	1.5	3.3	--
6 & 7	--	--	--	--	--	--	--	--	--
1 & 2 & 3	44.2	--	--	--	1.2	--	--	--	--
1 & 2 & 4	8.4	--	--	--	--	--	--	--	--
1 & 2 & 5	9.9	2.7	--	--	--	--	--	--	--
1 & 2 & 6	--	--	--	--	--	--	--	--	--
1 & 2 & 7	46.7	--	--	--	--	--	--	--	--
1 & 3 & 4	--	--	--	--	--	--	--	--	--
1 & 3 & 5	218.4	1.1	3.0	1.7	4.7	1.7	--	--	--
1 & 3 & 6	--	--	--	--	--	--	--	--	--
1 & 3 & 7	8.3	--	--	--	--	--	--	--	--
1 & 4 & 5	25.2	--	--	--	--	--	--	2.0	--
1 & 4 & 6	1.6	--	--	--	--	--	--	1.6	--
1 & 4 & 7	109.4	--	--	--	--	--	--	2.0	--
1 & 5 & 6	26.3	--	3.7	--	1.6	--	--	13.6	--
1 & 5 & 7	588.2	10.5	32.3	5.8	23.8	5.8	1.6	7.1	--
1 & 6 & 7	3.1	--	--	--	--	--	--	3.1	--
2 & 3 & 4	1.4	--	--	--	--	--	--	--	--
2 & 3 & 5	37.3	1.4	--	--	--	--	--	--	--
2 & 3 & 6	--	--	--	--	--	--	--	--	--
2 & 3 & 7	44.6	--	--	1.8	--	--	--	--	--
2 & 4 & 5	3.2	--	--	--	--	--	--	--	--
2 & 4 & 6	--	--	--	--	--	--	--	--	--
2 & 4 & 7	13.1	--	1.4	--	--	--	--	--	--
2 & 5 & 6	--	--	--	--	--	--	--	--	--
2 & 5 & 7	6.2	1.4	2.3	--	--	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--	--	--	--
3 & 4 & 5	5.4	--	--	--	--	--	--	--	--
3 & 4 & 6	--	--	--	--	--	--	--	--	--
3 & 4 & 7	2.5	--	--	--	--	--	--	--	--
3 & 5 & 6	22.9	--	--	--	--	--	--	4.7	--
3 & 5 & 7	187.6	1.5	--	--	4.8	--	--	1.5	--
3 & 6 & 7	--	--	--	--	--	--	--	--	--
4 & 5 & 6	10.4	--	--	--	--	--	--	7.4	--
4 & 5 & 7	43.7	--	--	--	--	1.4	--	2.0	--
4 & 6 & 7	--	--	--	--	--	--	--	--	--
5 & 6 & 7	48.5	1.8	--	1.4	3.8	1.5	--	28.5	--
4 or more	1,753.1	105.4	69.2	14.9	70.3	5.5	23.7	225.5	5.9
All factors	5,753.9	173.4	168.1	74.2	140.4	23.6	28.4	326.3	7.5

(Table 8 continued on next page)

(Table 8 continued)

Limiting factor	Forest type					
	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic
1	76.5	28.9	229.2	46.7	--	4.9
2	--	3.3	2.9	--	--	--
3	--	--	1.5	1.5	--	--
4	--	--	11.5	1.6	--	--
5	8.7	5.9	93.5	35.2	2.4	--
6	--	--	--	--	--	--
7	54.3	16.0	141.2	26.7	1.5	--
1 & 2	16.6	3.2	9.2	2.3	--	--
1 & 3	4.1	2.3	--	1.6	--	--
1 & 4	13.2	10.0	46.9	2.2	--	--
1 & 5	57.0	23.0	185.3	87.1	6.6	--
1 & 6	--	--	--	--	--	--
1 & 7	92.8	44.7	279.6	98.4	7.4	--
2 & 3	--	2.9	5.1	2.3	--	--
2 & 4	--	--	--	--	--	--
2 & 5	--	--	--	3.8	--	--
2 & 6	--	--	1.4	--	--	--
2 & 7	4.2	2.5	15.1	5.3	--	--
3 & 4	--	--	--	--	--	--
3 & 5	15.8	8.2	59.3	26.6	--	--
3 & 6	--	--	--	--	--	--
3 & 7	4.2	--	4.1	--	--	--
4 & 5	--	--	7.7	1.5	--	--
4 & 6	--	--	--	--	--	--
4 & 7	2.5	8.0	29.0	3.8	--	--
5 & 6	2.9	--	4.2	1.5	--	--
5 & 7	24.5	19.4	160.4	41.4	7.0	--
6 & 7	--	--	--	--	--	--
1 & 2 & 3	14.7	5.8	9.4	10.8	2.3	--
1 & 2 & 4	--	--	4.6	3.8	--	--
1 & 2 & 5	3.9	--	3.3	--	--	--
1 & 2 & 6	--	--	--	--	--	--
1 & 2 & 7	27.4	12.3	4.8	2.2	--	--
1 & 3 & 4	--	--	--	--	--	--
1 & 3 & 5	30.7	10.0	100.9	52.8	11.8	--
1 & 3 & 6	--	--	--	--	--	--
1 & 3 & 7	5.1	--	1.5	1.7	--	--
1 & 4 & 5	--	4.8	13.0	5.4	--	--
1 & 4 & 6	--	--	--	--	--	--
1 & 4 & 7	7.2	8.5	86.4	5.3	--	--
1 & 5 & 6	2.6	--	4.8	--	--	--
1 & 5 & 7	58.6	29.3	310.8	88.2	14.4	--
1 & 6 & 7	--	--	--	--	--	--
2 & 3 & 4	--	--	1.4	--	--	--
2 & 3 & 5	13.4	3.3	10.8	8.4	--	--
2 & 3 & 6	--	--	--	--	--	--
2 & 3 & 7	4.2	9.7	8.2	20.7	--	--
2 & 4 & 5	--	--	3.2	--	--	--
2 & 4 & 6	--	--	--	--	--	--
2 & 4 & 7	5.5	--	3.4	2.8	--	--
2 & 5 & 6	--	--	--	--	--	--
2 & 5 & 7	--	2.5	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--
3 & 4 & 5	--	--	3.9	1.5	--	--
3 & 4 & 6	--	--	--	--	--	--
3 & 4 & 7	--	--	2.5	--	--	--
3 & 5 & 6	7.6	1.5	3.0	6.1	--	--
3 & 5 & 7	10.7	19.6	92.0	44.0	13.5	--
3 & 6 & 7	--	--	--	--	--	--
4 & 5 & 6	--	1.6	1.4	--	--	--
4 & 5 & 7	--	--	24.6	14.2	1.5	--
4 & 6 & 7	--	--	--	--	--	--
5 & 6 & 7	--	1.5	10.0	--	--	--
4 or more	259.8	127.1	554.4	263.7	26.6	1.1
All factors	828.7	415.8	2,545.4	921.1	95.0	6.0

Table 9.--Area of timberland in operability class III (poor) by limiting factor and forest type, Michigan, 1980

(In thousand acres)

Limiting factor	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack
1	3,540.7	216.8	148.5	60.8	194.2	23.6	107.4	269.0	12.7
2	23.4	4.9	--	1.5	--	--	--	--	--
3	672.8	41.5	45.0	5.2	9.3	7.9	10.8	67.1	3.5
4	56.5	--	--	--	--	--	--	1.0	--
5	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--
7	1,160.3	59.1	15.2	13.8	46.4	10.6	16.3	141.3	4.8
1 & 2	67.1	16.4	2.6	5.1	--	--	--	2.3	1.0
1 & 3	439.6	26.0	28.5	--	20.4	1.7	17.9	39.7	1.7
1 & 4	17.5	2.6	--	--	--	--	--	2.6	--
1 & 5	2.0	--	2.0	--	--	--	--	--	--
1 & 6	--	--	--	--	--	--	--	--	--
1 & 7	499.2	12.0	14.1	20.2	32.0	1.5	56.5	50.7	4.3
2 & 3	52.8	7.4	--	--	--	--	--	1.6	--
2 & 4	22.7	2.2	--	--	--	--	--	--	--
2 & 5	--	--	--	--	--	--	--	--	--
2 & 6	--	--	--	--	--	--	--	--	--
2 & 7	4.1	2.2	1.9	--	--	--	--	--	--
3 & 4	1.6	--	--	--	--	--	--	--	--
3 & 5	68.2	2.6	29.3	--	1.5	--	7.8	12.6	1.6
3 & 6	--	--	--	--	--	--	--	--	--
3 & 7	96.9	6.4	--	--	4.9	--	11.6	8.4	3.0
4 & 5	--	--	--	--	--	--	--	--	--
4 & 6	--	--	--	--	--	--	--	--	--
4 & 7	12.7	--	--	--	1.5	--	--	--	--
5 & 6	--	--	--	--	--	--	--	--	--
5 & 7	--	--	--	--	--	--	--	--	--
6 & 7	--	--	--	--	--	--	--	--	--
1 & 2 & 3	111.0	20.7	2.6	3.3	5.2	--	1.6	--	2.7
1 & 2 & 4	16.9	--	--	--	--	--	--	2.3	1.9
1 & 2 & 5	--	--	--	--	--	--	--	--	--
1 & 2 & 6	--	--	--	--	--	--	--	--	--
1 & 2 & 7	6.8	2.2	--	1.4	--	1.5	--	1.7	--
1 & 3 & 4	13.6	--	--	--	--	--	--	2.2	--
1 & 3 & 5	24.9	--	8.0	--	--	2.6	2.1	5.0	--
1 & 3 & 6	--	--	--	--	--	--	--	--	--
1 & 3 & 7	49.7	12.2	--	--	1.6	--	6.6	1.5	1.7
1 & 4 & 5	--	--	--	--	--	--	--	--	--
1 & 4 & 6	--	--	--	--	--	--	--	--	--
1 & 4 & 7	2.9	--	--	--	--	--	--	1.3	--
1 & 5 & 6	--	--	--	--	--	--	--	--	--
1 & 5 & 7	--	--	--	--	--	--	--	--	--
1 & 6 & 7	--	--	--	--	--	--	--	--	--
2 & 3 & 4	15.9	--	--	--	--	--	--	1.5	1.6
2 & 3 & 5	5.8	1.4	2.4	--	--	--	--	--	--
2 & 3 & 6	--	--	--	--	--	--	--	--	--
2 & 3 & 7	7.3	1.5	--	--	--	--	--	--	--
2 & 4 & 5	--	--	--	--	--	--	--	--	--
2 & 4 & 6	--	--	--	--	--	--	--	--	--
2 & 4 & 7	--	--	--	--	--	--	--	--	--
2 & 5 & 6	--	--	--	--	--	--	--	--	--
2 & 5 & 7	--	--	--	--	--	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--	--	--	--
3 & 4 & 5	--	--	--	--	--	--	--	--	--
3 & 4 & 6	--	--	--	--	--	--	--	--	--
3 & 4 & 7	--	--	--	--	--	--	--	--	--
3 & 5 & 6	0.2	--	--	--	--	--	--	0.2	--
3 & 5 & 7	6.3	1.6	--	--	--	--	4.7	--	--
3 & 6 & 7	--	--	--	--	--	--	--	--	--
4 & 5 & 6	--	--	--	--	--	--	--	--	--
4 & 5 & 7	--	--	--	--	--	--	--	--	--
4 & 6 & 7	--	--	--	--	--	--	--	--	--
5 & 6 & 7	--	--	--	--	--	--	--	--	--
4 or more	45.4	2.9	--	--	1.7	--	2.8	4.7	--
All factors	7,044.8	442.6	300.1	111.3	318.7	49.4	246.1	616.7	40.5

(Table 9 continued on next page)

(Table 9 continued)

Limiting factor	Forest type					
	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic
1	315.8	289.4	1,308.0	496.2	92.3	6.0
2	--	3.4	10.0	3.6	--	--
3	82.1	28.5	154.2	182.7	29.1	5.9
4	21.5	4.5	23.6	5.9	--	--
5	--	--	--	--	--	--
6	--	--	--	--	--	--
7	43.3	51.8	593.4	127.0	37.3	--
1 & 2	12.4	14.2	8.9	4.2	--	--
1 & 3	48.8	23.4	95.6	99.1	24.5	12.3
1 & 4	3.7	2.3	4.9	1.4	--	--
1 & 5	--	--	--	--	--	--
1 & 6	--	--	--	--	--	--
1 & 7	21.2	23.5	162.8	83.8	16.6	--
2 & 3	8.8	12.1	9.7	13.2	--	--
2 & 4	4.9	6.0	7.0	2.6	--	--
2 & 5	--	--	--	--	--	--
2 & 6	--	--	--	--	--	--
2 & 7	--	--	--	--	--	--
3 & 4	--	--	1.6	--	--	--
3 & 5	--	--	2.2	4.1	--	6.5
3 & 6	--	--	--	--	--	--
3 & 7	12.4	5.2	16.5	23.6	4.9	--
4 & 5	--	--	--	--	--	--
4 & 6	--	--	--	--	--	--
4 & 7	--	--	11.2	--	--	--
5 & 6	--	--	--	--	--	--
5 & 7	--	--	--	--	--	--
6 & 7	--	--	--	--	--	--
1 & 2 & 3	12.0	22.7	12.9	23.9	--	3.4
1 & 2 & 4	10.5	--	2.2	--	--	--
1 & 2 & 5	--	--	--	--	--	--
1 & 2 & 6	--	--	--	--	--	--
1 & 2 & 7	--	--	--	--	--	--
1 & 3 & 4	--	--	11.4	--	--	--
1 & 3 & 5	--	5.7	1.5	--	--	--
1 & 3 & 6	--	--	--	--	--	--
1 & 3 & 7	2.2	--	--	21.6	2.3	--
1 & 4 & 5	--	--	--	--	--	--
1 & 4 & 6	--	--	--	--	--	--
1 & 4 & 7	--	--	1.6	--	--	--
1 & 5 & 6	--	--	--	--	--	--
1 & 5 & 7	--	--	--	--	--	--
1 & 6 & 7	--	--	--	--	--	--
2 & 3 & 4	--	6.3	4.2	--	2.3	--
2 & 3 & 5	--	--	2.0	--	--	--
2 & 3 & 6	--	--	--	--	--	--
2 & 3 & 7	--	--	1.9	3.9	--	--
2 & 4 & 5	--	--	--	--	--	--
2 & 4 & 6	--	--	--	--	--	--
2 & 4 & 7	--	--	--	--	--	--
2 & 5 & 6	--	--	--	--	--	--
2 & 5 & 7	--	--	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--
3 & 4 & 5	--	--	--	--	--	--
3 & 4 & 6	--	--	--	--	--	--
3 & 4 & 7	--	--	--	--	--	--
3 & 5 & 6	--	--	--	--	--	--
3 & 5 & 7	--	--	--	--	--	--
3 & 6 & 7	--	--	--	--	--	--
4 & 5 & 6	--	--	--	--	--	--
4 & 5 & 7	--	--	--	--	--	--
4 & 6 & 7	--	--	--	--	--	--
5 & 6 & 7	--	--	--	--	--	--
4 or more	8.5	10.0	6.6	6.7	1.5	--
All factors	608.1	509.0	2,453.9	1,103.5	210.8	34.1

Table 10.--Area of timberland by forest type, average growing-stock volume and operability class, Michigan, 1980

(In thousand acres)

Forest type and average growing-stock volume per acre (cu.ft. per acre)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack pine					
More than 1000	205.7	2.5	86.1	117.1	--
400-1000	408.8	--	87.3	263.7	57.8
Less than 400	221.9	--	--	61.8	160.1
All classes	836.4	2.5	173.4	442.6	217.9
Red pine					
More than 1000	320.8	1.2	126.0	184.8	8.8
400-1000	194.6	--	42.1	105.8	46.7
Less than 400	141.1	--	--	9.5	131.6
All classes	656.5	1.2	168.1	300.1	187.1
White pine					
More than 1000	135.5	2.5	63.4	69.6	--
400-1000	49.1	--	10.8	30.4	7.9
Less than 400	29.5	--	--	11.3	18.2
All classes	214.1	2.5	74.2	111.3	26.1
Balsam fir					
More than 1000	297.2	--	98.0	198.0	1.2
400-1000	231.8	--	42.4	113.8	75.6
Less than 400	106.6	--	--	6.9	99.7
All classes	635.6	--	140.4	318.7	176.5
White spruce					
More than 1000	54.9	--	23.6	31.3	--
400-1000	27.8	--	--	16.6	11.2
Less than 400	17.2	--	--	1.5	15.7
All classes	99.9	--	23.6	49.4	26.9
Black spruce					
More than 1000	127.3	--	14.8	112.5	--
400-1000	226.1	--	13.6	130.5	82.0
Less than 400	166.5	--	--	3.1	163.4
All classes	519.9	--	28.4	246.1	245.4
Northern white-cedar					
More than 1000	683.7	3.7	254.6	422.7	2.7
400-1000	348.7	--	71.7	181.6	95.4
Less than 400	141.3	--	--	12.4	128.9
All classes	1,173.7	3.7	326.3	616.7	227.0
Tamarack					
More than 1000	7.9	--	1.6	6.3	--
400-1000	43.7	--	5.9	27.0	10.8
Less than 400	63.2	--	--	7.2	56.0
All classes	114.8	--	7.5	40.5	66.8

(Table 10 continued on next page)

(Table 10 continued)

Forest type and average growing-stock volume per acre (cu.ft. per acre)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Oak-hickory					
More than 1000	929.4	28.5	539.7	355.6	5.6
400-1000	594.0	--	289.0	195.4	109.6
Less than 400	249.1	--	--	57.1	192.0
All classes	1,772.5	28.5	828.7	608.1	307.2
Elm-ash-soft maple					
More than 1000	545.2	--	295.1	247.0	3.1
400-1000	447.2	--	120.7	187.3	139.2
Less than 400	335.1	--	--	74.7	260.4
All classes	1,327.5	--	415.8	509.0	402.7
Maple-birch					
More than 1000	4,091.8	48.7	2,191.5	1,819.9	31.7
400-1000	1,392.4	--	353.9	568.6	469.9
Less than 400	614.3	--	--	65.4	548.9
All classes	6,098.5	48.7	2,545.4	2,453.9	1,050.5
Aspen					
More than 1000	1,329.7	13.8	747.0	556.2	12.7
400-1000	1,133.9	--	174.1	489.2	470.6
Less than 400	942.0	--	--	58.1	883.9
All classes	3,405.6	13.8	921.1	1,103.5	1,367.2
Paper birch					
More than 1000	231.9	--	87.4	144.5	--
400-1000	98.9	--	7.6	62.5	28.8
Less than 400	44.7	--	--	3.8	40.9
All classes	375.5	--	95.0	210.8	69.7
Exotic					
More than 1000	11.0	--	4.9	6.1	--
400-1000	27.4	--	1.1	24.6	1.7
Less than 400	47.9	--	--	3.4	44.5
All classes	86.3	--	6.0	34.1	46.2
Nonstocked					
More than 1000	--	--	--	--	--
400-1000	--	--	--	--	--
Less than 400	173.0	--	--	--	173.0
All classes	173.0	--	--	--	173.0
All types					
More than 1000	8,972.0	100.9	4,533.7	4,271.6	65.8
400-1000	5,224.4	--	1,220.2	2,397.0	1,607.2
Less than 400	3,293.4	--	--	376.2	2,917.2
All classes	17,489.8	100.9	5,753.9	7,044.8	4,590.2

Table 11.--Area of timberland by forest type, stand-age class and operability class, Michigan, 1980

(In thousand acres)

Forest type and stand-age class (years)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack pine					
less than 21	185.0	--	--	16.4	168.6
21-40	230.3	--	41.9	139.1	49.3
41-60	306.2	--	90.5	215.7	--
61-80	91.2	2.5	38.7	50.0	--
81-100	18.9	--	--	18.9	--
101-120	2.3	--	2.3	--	--
More than 120	2.5	--	--	2.5	--
All ages	836.4	2.5	173.4	442.6	217.9
Red pine					
less than 21	192.0	--	2.4	15.7	173.9
21-40	299.1	--	96.0	189.9	13.2
41-60	82.5	1.2	39.6	41.7	--
61-80	41.1	--	12.7	28.4	--
81-100	23.8	--	13.7	10.1	--
101-120	16.5	--	3.7	12.8	--
More than 120	1.5	--	--	1.5	--
All ages	656.5	1.2	168.1	300.1	187.1
White pine					
less than 21	19.5	--	--	--	19.5
21-40	22.9	--	1.7	14.6	6.6
41-60	34.1	--	19.7	14.4	--
61-80	60.3	2.5	32.9	24.9	--
81-100	46.8	--	13.5	33.3	--
101-120	13.0	--	--	13.0	--
More than 120	17.5	--	6.4	11.1	--
All ages	214.1	2.5	74.2	111.3	26.1
Balsam fir					
less than 21	125.6	--	--	--	125.6
21-40	122.5	--	17.9	53.7	50.9
41-60	211.6	--	57.1	154.5	--
61-80	99.5	--	37.9	61.6	--
81-100	37.0	--	12.8	24.2	--
101-120	23.5	--	6.3	17.2	--
More than 120	15.9	--	8.4	7.5	--
All ages	635.6	--	140.4	318.7	176.5
White spruce					
less than 21	25.7	--	--	--	25.7
21-40	21.0	--	1.6	18.2	1.2
41-60	25.6	--	11.2	14.4	--
61-80	8.0	--	1.5	6.5	--
81-100	7.9	--	2.5	5.4	--
101-120	9.5	--	4.6	4.9	--
More than 120	2.2	--	2.2	--	--
All ages	99.9	--	23.6	49.4	26.9

(Table 11 continued on next page)

(Table 11 continued)

Forest type and stand-age class (years)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Black spruce					
less than 21	126.0	--	--	2.9	123.1
21-40	201.7	--	--	91.7	110.0
41-60	102.3	--	16.3	77.3	8.7
61-80	52.8	--	6.1	43.1	3.6
81-100	10.7	--	--	10.7	--
101-120	13.3	--	4.4	8.9	--
More than 120	13.1	--	1.6	11.5	--
All ages	519.9	--	28.4	246.1	245.4
Northern white-cedar					
less than 21	81.4	--	1.5	2.3	77.6
21-40	161.5	--	9.9	21.0	130.6
41-60	176.5	--	63.1	94.6	18.8
61-80	268.4	--	83.7	184.7	--
81-100	221.7	--	86.3	135.4	--
101-120	139.4	2.2	35.4	101.8	--
More than 120	124.8	1.5	46.4	76.9	--
All ages	1,173.7	3.7	326.3	616.7	227.0
Tamarack					
less than 21	35.6	--	2.3	--	33.3
21-40	27.4	--	--	--	27.4
41-60	24.2	--	2.0	16.1	6.1
61-80	15.7	--	1.6	14.1	--
81-100	5.9	--	1.6	4.3	--
101-120	3.7	--	--	3.7	--
More than 120	2.3	--	--	2.3	--
All ages	114.8	--	7.5	40.5	66.8
Oak-hickory					
less than 21	297.1	--	2.6	--	294.5
21-40	122.0	--	53.0	56.3	12.7
41-60	485.4	4.2	251.9	229.3	--
61-80	394.7	8.4	219.1	167.2	--
81-100	250.5	9.1	155.3	86.1	--
101-120	167.0	6.8	116.9	43.3	--
More than 120	55.8	--	29.9	25.9	--
All ages	1,772.5	28.5	828.7	608.1	307.2
Elm-ash-soft maple					
less than 21	336.8	--	--	--	336.8
21-40	214.9	--	42.6	108.7	63.6
41-60	264.1	--	123.0	138.8	2.3
61-80	206.9	--	89.4	117.5	--
81-100	140.8	--	86.4	54.4	--
101-120	102.1	--	48.4	53.7	--
More than 120	61.9	--	26.0	35.9	--
All ages	1,327.5	--	415.8	509.0	402.7

(Table 11 continued on next page)

(Table 11 continued)

Forest type and stand-age class (years)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Maple-birch					
less than 21	929.8	--	--	--	929.8
21-40	567.9	--	195.2	253.2	119.5
41-60	1,792.3	5.9	909.1	876.1	1.2
61-80	917.0	3.9	478.9	434.2	--
81-100	916.5	21.1	478.7	416.7	--
101-120	618.6	14.5	317.5	286.6	--
More than 120	356.4	3.3	166.0	187.1	--
All ages	6,098.5	48.7	2,545.4	2,453.9	1,050.5
Aspen					
less than 21	1,293.0	--	--	13.6	1,279.4
21-40	506.4	--	135.4	286.4	84.6
41-60	990.1	4.6	455.5	526.8	3.2
61-80	395.8	4.0	206.1	185.7	--
81-100	161.6	5.2	90.4	66.0	--
101-120	50.1	--	33.7	16.4	--
More than 120	8.6	--	--	8.6	--
All ages	3,405.6	13.8	921.1	1,103.5	1,367.2
Paper birch					
less than 21	63.9	--	--	6.6	57.3
21-40	37.1	--	5.6	19.1	12.4
41-60	137.8	--	40.9	96.9	--
61-80	106.7	--	32.4	74.3	--
81-100	20.4	--	11.4	9.0	--
101-120	3.1	--	1.5	1.6	--
More than 120	6.5	--	3.2	3.3	--
All ages	375.5	--	95.0	210.8	69.7
Exotic					
less than 21	38.5	--	--	--	38.5
21-40	38.3	--	1.1	29.5	7.7
41-60	9.5	--	4.9	4.6	--
61-80	--	--	--	--	--
81-100	--	--	--	--	--
101-120	--	--	--	--	--
More than 120	--	--	--	--	--
All ages	86.3	--	6.0	34.1	46.2
Nonstocked					
less than 21	139.7	--	--	--	139.7
21-40	18.8	--	--	--	18.8
41-60	10.9	--	--	--	10.9
61-80	--	--	--	--	--
81-100	3.6	--	--	--	3.6
101-120	--	--	--	--	--
More than 120	--	--	--	--	--
All ages	173.0	--	--	--	173.0
All types					
less than 21	3,889.6	--	8.8	57.5	3,823.3
21-40	2,591.8	--	601.9	1,281.4	708.5
41-60	4,653.1	15.9	2,084.8	2,501.2	51.2
61-80	2,658.1	21.3	1,241.0	1,392.2	3.6
81-100	1,866.1	35.4	952.6	874.5	3.6
101-120	1,162.1	23.5	574.7	563.9	--
More than 120	669.0	4.8	290.1	374.1	--
All ages	17,489.8	100.9	5,753.9	7,044.8	4,590.2

Table 12.--Area of timberland by forest type, ownership class and operability class, Michigan, 1980

(In thousand acres)

Forest type and ownership class	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack Pine					
National Forest	268.1	--	46.8	159.4	61.9
Other federal	8.9	--	1.4	5.7	1.8
Indian	--	--	--	--	--
State	360.5	--	87.2	169.3	104.0
County and municipal	17.3	--	1.6	7.5	8.2
Forest industry	11.9	--	3.0	7.6	1.3
Farmer	25.4	--	8.6	6.3	10.5
Miscellaneous private	144.3	2.5	24.8	86.8	30.2
All owners	836.4	2.5	173.4	442.6	217.9
Red pine					
National Forest	319.4	--	84.4	110.4	124.6
Other federal	1.9	--	--	1.9	--
Indian	--	--	--	--	--
State	161.4	1.2	48.2	81.1	30.9
County and municipal	9.8	--	3.4	4.7	1.7
Forest industry	4.8	--	1.4	3.4	--
Farmer	58.9	--	9.1	42.3	7.5
Miscellaneous private	100.3	--	21.6	56.3	22.4
All owners	656.5	1.2	168.1	300.1	187.1
White pine					
National Forest	22.3	--	11.0	11.3	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	68.2	--	23.2	27.7	17.3
County and municipal	--	--	--	--	--
Forest industry	18.7	--	4.7	14.0	--
Farmer	27.5	2.5	9.7	11.4	3.9
Miscellaneous private	77.4	--	25.6	46.9	4.9
All owners	214.1	2.5	74.2	111.3	26.1
Balsam fir					
National Forest	115.8	--	5.5	90.0	20.3
Other federal	3.1	--	1.6	1.5	--
Indian	--	--	--	--	--
State	118.3	--	35.4	47.5	35.4
County and municipal	3.3	--	1.7	--	1.6
Forest industry	135.6	--	23.9	59.6	52.1
Farmer	47.2	--	15.2	18.8	13.2
Miscellaneous private	212.3	--	57.1	101.3	53.9
All owners	635.6	--	140.4	318.7	176.5
White spruce					
National Forest	--	--	--	--	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	22.5	--	4.6	8.1	9.8
County and municipal	2.5	--	--	--	2.5
Forest industry	21.0	--	4.8	13.3	2.9
Farmer	10.2	--	4.7	3.1	2.4
Miscellaneous private	43.7	--	9.5	24.9	9.3
All owners	99.9	--	23.6	49.4	26.9

(Table 12 continued on next page)

(Table 12 continued)

Forest type and ownership class	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Black spruce					
National Forest	161.7	--	5.6	124.0	32.1
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	149.3	--	10.6	50.1	88.6
County and municipal	3.2	--	--	1.7	1.5
Forest industry	70.3	--	4.5	22.1	43.7
Farmer	20.2	--	3.1	4.5	12.6
Miscellaneous private	115.2	--	4.6	43.7	66.9
All owners	519.9	--	28.4	246.1	245.4
Northern white-cedar					
National Forest	68.3	--	8.9	54.1	5.3
Other federal	--	--	--	--	--
Indian	1.6	--	--	--	1.6
State	323.8	2.2	103.0	165.9	52.7
County and municipal	11.0	--	--	8.1	2.9
Forest industry	205.3	--	42.9	131.1	31.3
Farmer	212.4	--	60.4	90.8	61.2
Miscellaneous private	351.3	1.5	111.1	166.7	72.0
All owners	1,173.7	3.7	326.3	616.7	227.0
Tamarack					
National Forest	--	--	--	--	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	44.6	--	3.2	14.0	27.4
County and municipal	--	--	--	--	--
Forest industry	20.0	--	--	9.7	10.3
Farmer	11.4	--	2.0	3.4	6.0
Miscellaneous private	38.8	--	2.3	13.4	23.1
All owners	114.8	--	7.5	40.5	66.8
Oak-hickory					
National Forest	245.9	--	130.6	78.5	36.8
Other federal	10.8	--	--	--	10.8
Indian	--	--	--	--	--
State	341.9	2.6	142.9	124.3	72.1
County and municipal	19.0	--	2.3	10.9	5.8
Forest industry	13.0	--	3.9	9.1	--
Farmer	364.3	13.4	155.4	150.6	44.9
Miscellaneous private	777.6	12.5	393.6	234.7	136.8
All owners	1,772.5	28.5	828.7	608.1	307.2
Elm-ash-soft maple					
National Forest	40.6	--	14.9	25.7	--
Other federal	4.3	--	--	4.3	--
Indian	1.5	--	--	1.5	--
State	185.6	--	62.7	62.3	60.6
County and municipal	23.4	--	10.2	6.3	6.9
Forest industry	101.2	--	32.0	44.6	24.6
Farmer	440.7	--	156.2	148.4	136.1
Miscellaneous private	530.2	--	139.8	215.9	174.5
All owners	1,327.5	--	415.8	509.0	402.7

(Table 12 continued on next page)

(Table 12 continued)

Forest type and ownership class	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Maple-birch					
National Forest	687.2	--	230.1	442.5	14.6
Other federal	4.9	--	1.6	--	3.3
Indian	12.6	--	9.4	3.2	--
State	846.6	3.4	319.9	344.1	179.2
County and municipal	62.4	--	24.8	31.0	6.6
Forest industry	1,105.5	10.6	506.3	482.8	105.8
Farmer	1,212.1	24.8	484.7	386.8	315.8
Miscellaneous private	2,167.2	9.9	968.6	763.5	425.2
All owners	6,098.5	48.7	2,545.4	2,453.9	1,050.5
Aspen					
National Forest	452.6	--	113.3	171.1	168.2
Other federal	7.9	--	--	6.4	1.5
Indian	6.7	--	5.1	--	1.6
State	832.9	--	202.0	200.0	430.9
County and municipal	29.3	--	5.4	14.6	9.3
Forest industry	210.2	--	42.8	70.3	97.1
Farmer	555.3	6.9	179.2	197.3	171.9
Miscellaneous private	1,310.7	6.9	373.3	443.8	486.7
All owners	3,405.6	13.8	921.1	1,103.5	1,367.2
Paper birch					
National Forest	41.2	--	0.9	40.3	--
Other federal	1.5	--	--	1.5	--
Indian	--	--	--	--	--
State	73.2	--	32.9	36.0	4.3
County and municipal	5.3	--	--	--	5.3
Forest industry	61.0	--	11.3	38.0	11.7
Farmer	56.6	--	9.4	31.4	15.8
Miscellaneous private	136.7	--	40.5	63.6	32.6
All owners	375.5	--	95.0	210.8	69.7
Exotic					
National Forest	--	--	--	--	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	--	--	--	--	--
County and municipal	--	--	--	--	--
Forest industry	1.0	--	--	--	1.0
Farmer	17.8	--	--	13.3	4.5
Miscellaneous private	67.5	--	6.0	20.8	40.7
All owners	86.3	--	6.0	34.1	46.2
Nonstocked					
National Forest	16.0	--	--	--	16.0
Other federal	1.7	--	--	--	1.7
Indian	--	--	--	--	--
State	44.7	--	--	--	44.7
County and municipal	--	--	--	--	--
Forest industry	2.5	--	--	--	2.5
Farmer	38.6	--	--	--	38.6
Miscellaneous private	69.5	--	--	--	69.5
All owners	173.0	--	--	--	173.0
All types					
National Forest	2,439.1	--	652.0	1,307.3	479.8
Other federal	45.0	--	4.6	21.3	19.1
Indian	22.4	--	14.5	4.7	3.2
State	3,573.5	9.4	1,075.8	1,330.4	1,157.9
County and municipal	186.5	--	49.4	84.8	52.3
Forest industry	1,982.0	10.6	681.5	905.6	384.3
Farmer	3,098.6	47.6	1,097.7	1,108.4	844.9
Miscellaneous private	6,142.7	33.3	2,178.4	2,282.3	1,648.7
All owners	17,489.8	100.9	5,753.9	7,044.8	4,590.2

Table 13.--Area of timberland by distance from major wood-using center and operability class, Michigan, 1980

(In thousand acres)

Wood-using center and distance (miles)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Alpena					
Less than 20	263.3	--	66.8	94.9	101.6
20-50	1,277.4	2.4	314.0	543.3	417.7
More than 50	15,949.1	98.5	5,373.1	6,406.6	4,070.9
Brighton					
Less than 20	142.3	6.8	59.4	46.8	29.3
20-50	509.8	6.8	208.8	141.8	152.4
More than 50	16,837.7	87.3	5,485.7	6,856.2	4,408.5
Cadillac					
Less than 20	475.4	2.3	190.4	165.6	117.1
20-50	2,277.6	14.2	777.6	754.6	731.2
More than 50	14,736.8	84.4	4,785.9	6,124.6	3,741.9
Escanaba					
Less than 20	328.2	1.4	87.3	144.4	95.1
20-50	1,795.4	10.6	442.7	902.7	439.4
More than 50	15,366.2	88.9	5,223.9	5,997.7	4,055.7
Filer City					
Less than 20	287.1	--	99.8	103.9	83.4
20-50	1,252.9	6.8	464.8	441.4	339.9
More than 50	15,949.8	94.1	5,189.3	6,499.5	4,166.9
Gaylord-Grayling					
Less than 20	558.2	2.4	186.9	188.0	180.9
20-50	2,446.1	9.8	812.7	880.5	743.1
More than 50	14,485.5	88.7	4,754.3	5,976.3	3,666.2
Iron Mountain					
Less than 20	269.8	1.5	95.8	94.5	78.0
20-50	1,902.2	8.8	510.9	831.8	550.7
More than 50	15,317.8	90.6	5,147.2	6,118.5	3,961.5
L'Anse					
Less than 20	615.6	--	305.3	234.5	75.8
20-50	2,394.4	1.6	900.6	1,111.3	380.9
More than 50	14,479.8	99.3	4,548.0	5,699.0	4,133.5
Manistique					
Less than 20	345.9	1.7	71.7	199.8	72.7
20-50	1,621.8	6.7	428.6	801.7	384.8
More than 50	15,522.1	92.5	5,253.6	6,043.3	4,132.7
Midland					
Less than 20	217.5	--	61.1	79.2	77.2
20-50	1,095.0	15.2	384.5	339.3	356.0
More than 50	16,177.3	85.7	5,308.3	6,626.3	4,157.0
Muskegon					
Less than 20	223.4	--	93.0	61.0	69.4
20-50	832.7	8.4	315.3	260.8	248.2
More than 50	16,433.7	92.5	5,345.6	6,723.0	4,272.6
Newberry					
Less than 20	623.7	3.0	129.4	296.2	195.1
20-50	1,494.0	6.8	279.8	862.8	344.6
More than 50	15,372.1	91.1	5,344.7	5,885.8	4,050.5
Ontonagon					
Less than 20	364.3	--	177.6	144.0	42.7
20-50	1,717.8	4.8	660.1	792.6	260.3
More than 50	15,407.7	96.1	4,916.2	6,108.2	4,287.2
Otsego					
Less than 20	223.8	--	109.8	52.1	61.9
20-50	600.3	7.6	205.8	182.8	204.1
More than 50	16,665.7	93.3	5,438.3	6,809.9	4,324.2
West Branch					
Less than 20	503.8	2.3	150.2	181.9	169.4
20-50	2,098.4	12.1	597.3	792.7	696.3
More than 50	14,887.6	86.5	5,006.4	6,070.2	3,724.5
Closest wood-using center					
Less than 20	5,442.3	21.4	1,884.5	2,086.8	1,449.6
20-50	10,688.1	69.2	3,378.6	4,480.5	2,759.8
More than 50	1,359.4	10.3	490.8	477.5	380.8

Table 14.--Growing-stock volume on timberland by operability class component and forest type, Michigan, 1980

(In thousand cubic feet)

Operability class component	All types	Forest type							
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack
Stand area (acres)									
More than 60	4,259,224	115,265	76,614	30,446	99,233	37,291	58,644	433,816	15,900
10-60	8,076,397	227,065	333,827	141,458	200,068	37,290	52,799	409,311	10,973
Less than 10	6,768,201	273,069	278,924	128,495	355,759	40,886	231,166	556,658	27,183
All classes	19,103,822	615,399	689,365	300,399	655,060	115,467	342,609	1,399,785	54,056
Growing-stock volume (cubic feet/acre)									
More than 1000	14,845,051	280,191	542,975	259,176	463,741	94,921	168,132	1,120,404	9,835
400-1000	3,706,755	289,833	135,547	33,678	168,618	17,893	147,937	250,796	30,647
Less than 400	552,016	45,375	10,843	7,545	22,701	2,653	26,540	28,585	13,574
All classes	19,103,822	615,399	689,365	300,399	655,060	115,467	342,609	1,399,785	54,056
Sawtimber volume (board feet/acre)									
More than 2500	11,575,470	233,706	354,301	261,890	381,911	74,392	74,696	715,464	6,209
700-2500	5,470,850	263,231	170,868	32,003	208,374	22,785	170,156	493,783	26,823
Less than 700	2,057,502	118,462	164,196	6,506	64,775	18,290	97,757	190,538	21,024
All classes	19,103,822	615,399	689,365	300,399	655,060	115,467	342,609	1,399,785	54,056
Percent cull trees (percent)									
Less than 20	16,701,643	569,796	664,408	267,137	563,812	107,033	309,649	1,177,261	46,880
20-50	2,252,166	39,943	23,623	32,558	89,569	8,434	32,645	215,564	4,927
More than 50	150,013	5,660	1,334	704	1,679	--	315	6,960	2,249
All classes	19,103,822	615,399	689,365	300,399	655,060	115,467	342,609	1,399,785	54,056
Average d.b.h. of growing-stock trees (inches)									
More than 9	6,241,488	93,697	113,039	191,898	98,949	15,711	10,024	158,300	3,884
6-9	12,645,219	506,342	517,494	108,501	549,525	96,450	308,023	1,208,415	44,218
Less than 6	217,115	15,360	58,832	--	6,586	3,306	24,562	33,070	5,954
All classes	19,103,822	615,399	689,365	300,399	655,060	115,467	342,609	1,399,785	54,056
Average merchantable height of growing-stock trees (feet)									
More than 28	15,044,742	289,703	384,431	264,704	401,591	78,542	115,510	250,438	20,176
16-28	4,034,691	325,262	303,073	35,695	253,039	36,925	226,180	1,136,487	32,706
Less than 16	24,389	434	1,861	--	430	--	919	12,860	1,174
All classes	19,103,822	615,399	689,365	300,399	655,060	115,467	342,609	1,399,785	54,056
Distance to road (miles)									
Less than 1/4	6,974,766	267,253	285,270	145,088	180,572	40,746	57,080	353,579	18,184
1/4-3/4	9,262,494	255,150	352,740	102,599	332,091	50,223	151,897	725,378	19,126
More than 3/4	2,866,562	92,996	51,355	52,712	142,397	24,498	133,632	320,828	16,746
All classes	19,103,822	615,399	689,365	300,399	655,060	115,467	342,609	1,399,785	54,056

(Table 14 continued on next page)

(Table 14 continued)

Operability class component	Forest type						
	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic	Non-stocked
Stand area (acres)							
More than 60	376,219	275,628	1,954,942	699,518	81,419	3,030	1,259
10-60	1,040,962	476,669	3,586,408	1,354,252	184,949	20,323	43
Less than 10	596,937	505,530	2,513,536	1,058,101	177,151	22,108	2,698
All classes	2,014,118	1,257,827	8,054,886	3,111,871	443,519	45,461	4,000
Growing-stock volume (cubic feet/acre)							
More than 1000	1,513,594	894,785	6,926,413	2,185,089	366,876	18,919	--
400-1000	447,092	299,365	1,017,627	778,371	69,070	20,281	--
Less than 400	53,432	63,677	110,846	148,411	7,573	6,261	4,000
All classes	2,014,118	1,257,827	8,054,886	3,111,871	443,519	45,461	4,000
Sawtimber volume (board feet/acre)							
More than 2500	1,257,159	743,214	5,896,801	1,432,233	134,797	8,697	--
700-2500	578,342	395,331	1,742,277	1,132,913	224,650	8,946	368
Less than 700	178,617	119,282	415,808	546,725	84,072	27,818	3,632
All classes	2,014,118	1,257,827	8,054,886	3,111,871	443,519	45,461	4,000
Percent cull trees (percent)							
Less than 20	1,866,655	1,065,442	6,817,528	2,797,123	409,118	37,863	1,938
20-50	117,050	180,029	1,170,654	296,366	33,612	6,133	1,059
More than 50	30,413	12,356	66,704	18,382	789	1,465	1,003
All classes	2,014,118	1,257,827	8,054,886	3,111,871	443,519	45,461	4,000
Average d.b.h. of growing-stock trees (inches)							
More than 9	987,742	475,330	3,298,265	749,809	34,582	9,235	1,023
6-9	1,022,378	774,620	4,742,749	2,327,831	407,485	28,565	2,623
Less than 6	3,998	7,877	13,872	34,231	1,452	7,661	354
All classes	2,014,118	1,257,827	8,054,886	3,111,871	443,519	45,461	4,000
Average merchantable height of growing-stock trees (feet)							
More than 28	1,755,945	1,007,385	7,396,463	2,699,532	364,890	13,588	1,844
16-28	256,566	249,179	657,565	409,972	78,629	31,360	2,053
Less than 16	1,607	1,263	858	2,367	--	513	103
All classes	2,014,118	1,257,827	8,054,886	3,111,871	443,519	45,461	4,000
Distance to road (miles)							
Less than 1/4	929,393	478,667	2,856,451	1,195,899	125,531	39,803	1,250
1/4-3/4	976,764	650,829	3,915,660	1,502,125	220,651	5,658	1,603
More than 3/4	107,961	128,331	1,282,775	413,847	97,337	--	1,147
All classes	2,014,118	1,257,827	8,054,886	3,111,871	443,519	45,461	4,000

Table 15.--Growing-stock volume on timberland by forest type and operability class, Michigan, 1980

(In thousand cubic feet)

Forest type	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack pine	615,399	3,341	197,059	354,922	60,077
Red pine	689,365	1,779	258,663	385,630	43,293
White pine	300,399	3,133	140,572	147,709	8,985
Balsam fir	655,060	--	195,373	393,447	66,240
White spruce	115,467	--	39,710	66,566	9,191
Black spruce	342,609	--	33,015	237,764	71,830
Northern white-cedar	1,399,785	8,912	475,214	830,187	85,472
Tamarack	54,056	--	7,267	29,033	17,756
Oak-hickory	2,014,118	48,959	1,146,032	710,111	109,016
Elm-ash-soft maple	1,257,827	--	580,539	549,515	127,773
Maple-birch	8,054,886	89,254	4,070,461	3,466,173	428,998
Aspen	3,111,871	26,678	1,409,006	1,243,615	432,572
Paper birch	443,519	--	161,071	258,064	24,384
Exotic	45,461	--	9,758	29,181	6,522
Nonstocked	4,000	--	--	--	4,000
All types	19,103,822	182,056	8,723,740	8,701,917	1,496,109

Table 16.--Growing-stock volume on timberland in operability class II (medium) by limiting factor and forest type, Michigan, 1980

(In thousand cubic feet)

Limiting factor	All types	Forest type: Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack
1	791,368	4,704	--	58,379	--	--	3,375	13,306	--
2	5,349	--	--	--	--	--	--	--	--
3	3,489	--	--	--	--	--	--	--	--
4	20,719	--	--	--	--	3,294	--	--	--
5	294,381	9,878	7,364	2,465	--	1,874	--	2,415	--
6	--	--	--	--	--	--	--	--	--
7	465,664	--	6,508	2,648	--	--	--	4,074	--
1 & 2	31,558	3,709	1,773	--	--	--	--	--	--
1 & 3	9,503	--	--	--	--	--	--	--	--
1 & 4	122,567	2,387	2,339	--	--	--	--	--	--
1 & 5	781,814	34,099	29,651	22,458	26,876	--	--	3,771	--
1 & 6	3,759	--	--	--	--	--	--	3,759	--
1 & 7	1,043,337	2,665	7,853	19,499	8,475	1,950	--	6,367	--
2 & 3	9,172	744	--	--	--	--	--	--	--
2 & 4	1,747	--	1,747	--	--	--	--	--	--
2 & 5	3,627	--	--	--	--	--	--	--	--
2 & 6	1,354	--	--	--	--	--	--	--	--
2 & 7	29,128	--	3,695	--	--	--	--	1,372	--
3 & 4	--	--	--	--	--	--	--	--	--
3 & 5	165,515	2,984	--	--	--	--	--	--	1,720
3 & 6	--	--	--	--	--	--	--	--	--
3 & 7	10,996	--	--	--	--	--	--	--	--
4 & 5	11,793	--	--	--	--	--	--	--	--
4 & 6	--	--	--	--	--	--	--	--	--
4 & 7	77,180	--	--	--	--	--	--	--	--
5 & 6	32,524	--	7,195	--	2,379	--	--	11,097	--
5 & 7	529,819	5,457	14,724	3,864	11,742	7,868	1,555	6,047	--
6 & 7	--	--	--	--	--	--	--	--	--
1 & 2 & 3	31,950	--	--	--	536	--	--	--	--
1 & 2 & 4	7,189	--	--	--	--	--	--	--	--
1 & 2 & 5	9,266	2,636	--	--	--	--	--	--	--
1 & 2 & 6	--	--	--	--	--	--	--	--	--
1 & 2 & 7	40,362	--	--	--	--	--	--	--	--
1 & 3 & 4	--	--	--	--	--	--	--	--	--
1 & 3 & 5	322,815	1,308	4,402	1,734	5,927	2,010	--	--	--
1 & 3 & 6	--	--	--	--	--	--	--	--	--
1 & 3 & 7	8,887	--	--	--	--	--	--	--	--
1 & 4 & 5	34,929	--	--	--	--	--	--	3,976	--
1 & 4 & 6	2,419	--	--	--	--	--	--	2,419	--
1 & 4 & 7	167,920	--	--	--	--	--	--	5,691	--
1 & 5 & 6	46,910	--	8,862	--	3,717	--	--	25,764	--
1 & 5 & 7	1,089,365	16,146	75,175	12,971	47,056	9,242	3,272	12,581	--
1 & 6 & 7	4,234	--	--	--	--	--	--	4,234	--
2 & 3 & 4	828	--	--	--	--	--	--	--	--
2 & 3 & 5	28,860	1,181	--	--	--	--	--	--	--
2 & 3 & 6	--	--	--	--	--	--	--	--	--
2 & 3 & 7	30,307	--	--	804	--	--	--	--	--
2 & 4 & 5	2,709	--	--	--	--	--	--	--	--
2 & 4 & 6	--	--	--	--	--	--	--	--	--
2 & 4 & 7	11,152	--	1,074	--	--	--	--	--	--
2 & 5 & 6	--	--	--	--	--	--	--	--	--
2 & 5 & 7	5,080	1,045	1,670	--	--	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--	--	--	--
3 & 4 & 5	6,130	--	--	--	--	--	--	--	--
3 & 4 & 6	--	--	--	--	--	--	--	--	--
3 & 4 & 7	3,460	--	--	--	--	--	--	--	--
3 & 5 & 6	29,743	--	--	--	--	--	--	--	--
3 & 5 & 7	287,357	2,157	--	--	8,644	--	--	5,928	--
3 & 6 & 7	--	--	--	--	--	--	--	1,832	--
4 & 5 & 6	19,520	--	--	--	--	--	--	--	--
4 & 5 & 7	65,521	--	--	--	--	--	--	16,083	--
4 & 6 & 7	--	--	--	--	--	2,590	--	3,651	--
5 & 6 & 7	78,117	2,283	--	2,335	5,205	2,279	--	49,393	--
4 or more	1,942,347	103,676	84,631	13,415	74,816	8,603	24,813	291,454	5,547
All factors	8,723,740	197,059	258,663	140,572	195,373	39,710	33,015	475,214	7,267

(Table 16 continued on next page)

(Table 16 continued)

Limiting factor	Forest type					
	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic
1	129,588	55,741	436,616	80,962	--	8,697
2	--	3,128	2,221	--	--	--
3	--	--	1,550	1,939	--	--
4	--	--	15,162	2,263	--	--
5	20,098	10,753	170,850	62,541	6,143	--
6	--	--	--	--	--	--
7	100,276	30,651	263,314	55,227	2,966	--
1 & 2	13,795	1,780	8,209	2,292	--	--
1 & 3	4,833	2,734	--	1,936	--	--
1 & 4	20,698	14,015	79,127	4,001	--	--
1 & 5	105,769	48,125	339,538	160,609	10,918	--
1 & 6	--	--	--	--	--	--
1 & 7	170,607	81,525	552,256	176,517	15,623	--
2 & 3	--	1,479	4,677	2,272	--	--
2 & 4	--	--	--	--	--	--
2 & 5	--	--	--	3,627	--	--
2 & 6	--	--	1,354	--	--	--
2 & 7	4,023	2,336	13,164	4,538	--	--
3 & 4	--	--	--	--	--	--
3 & 5	21,299	9,283	86,045	44,184	--	--
3 & 6	--	--	--	--	--	--
3 & 7	5,626	--	5,370	--	--	--
4 & 5	--	--	9,775	2,018	--	--
4 & 6	--	--	--	--	--	--
4 & 7	5,870	15,729	50,440	5,141	--	--
5 & 6	2,984	--	5,975	2,894	--	--
5 & 7	46,897	37,964	293,702	85,708	14,291	--
6 & 7	--	--	--	--	--	--
1 & 2 & 3	9,905	3,796	7,986	7,748	1,979	--
1 & 2 & 4	--	--	3,769	3,420	--	--
1 & 2 & 5	3,496	--	3,134	--	--	--
1 & 2 & 6	--	--	--	--	--	--
1 & 2 & 7	24,104	9,782	4,404	2,072	--	--
1 & 3 & 4	--	--	--	--	--	--
1 & 3 & 5	50,521	10,928	144,359	80,735	20,891	--
1 & 3 & 6	--	--	--	--	--	--
1 & 3 & 7	5,423	--	1,611	1,853	--	--
1 & 4 & 5	--	6,740	17,017	7,196	--	--
1 & 4 & 6	--	--	--	--	--	--
1 & 4 & 7	10,496	11,644	130,552	9,537	--	--
1 & 5 & 6	2,751	--	5,816	--	--	--
1 & 5 & 7	93,719	53,829	569,660	170,508	25,206	--
1 & 6 & 7	--	--	--	--	--	--
2 & 3 & 4	--	--	828	--	--	--
2 & 3 & 5	9,611	2,846	9,106	6,116	--	--
2 & 3 & 6	--	--	--	--	--	--
2 & 3 & 7	2,285	6,605	6,078	14,535	--	--
2 & 4 & 5	--	--	2,709	--	--	--
2 & 4 & 6	--	--	--	--	--	--
2 & 4 & 7	4,600	--	3,235	2,243	--	--
2 & 5 & 6	--	--	--	--	--	--
2 & 5 & 7	--	2,365	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--
3 & 4 & 5	--	--	4,514	1,616	--	--
3 & 4 & 6	--	--	--	--	--	--
3 & 4 & 7	--	--	3,460	--	--	--
3 & 5 & 6	8,410	1,512	3,889	10,004	--	--
3 & 5 & 7	17,265	24,484	141,903	68,941	22,131	--
3 & 6 & 7	--	--	--	--	--	--
4 & 5 & 6	--	1,961	1,476	--	--	--
4 & 5 & 7	--	--	37,721	18,735	2,824	--
4 & 6 & 7	--	--	--	--	--	--
5 & 6 & 7	--	2,023	14,599	--	--	--
4 or more	251,083	126,781	613,290	305,078	38,099	1,061
All factors	1,146,032	580,539	4,070,461	1,409,006	161,071	9,758

Table 17.--Growing-stock volume on timberland in operability class III (poor) by limiting factor and forest type, Michigan, 1980

(In thousand cubic feet)

Limiting factor	All types	Forest type							
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack
1	4,757,598	194,114	192,062	91,963	248,530	28,001	101,782	404,737	10,662
2	7,418	1,750	--	590	--	--	--	--	--
3	641,477	33,223	55,617	3,349	7,234	11,708	8,580	67,247	2,166
4	48,352	--	--	--	--	--	--	527	--
5	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--
7	1,781,433	57,878	31,396	20,622	65,703	21,458	21,963	215,896	4,913
1 & 2	21,834	4,811	891	1,946	--	--	--	782	273
1 & 3	394,769	18,142	39,353	--	14,871	1,219	14,880	36,428	1,302
1 & 4	11,191	1,365	--	--	--	--	--	1,697	--
1 & 5	1,483	--	1,483	--	--	--	--	--	--
1 & 6	--	--	--	--	--	--	--	--	--
1 & 7	703,108	11,551	17,781	28,243	45,255	2,289	63,183	71,002	3,498
2 & 3	15,331	2,023	--	--	--	--	--	430	--
2 & 4	6,185	810	--	--	--	--	--	--	--
2 & 5	--	--	--	--	--	--	--	--	--
2 & 6	--	--	--	--	--	--	--	--	--
2 & 7	1,238	820	418	--	--	--	--	--	--
3 & 4	805	--	--	--	--	--	--	--	--
3 & 5	68,561	2,380	39,099	--	941	--	7,086	10,043	1,103
3 & 6	--	--	--	--	--	--	--	--	--
3 & 7	101,048	6,785	--	--	6,004	--	9,844	8,511	2,392
4 & 5	--	--	--	--	--	--	--	--	--
4 & 6	--	--	--	--	--	--	--	--	--
4 & 7	7,981	--	--	--	876	--	--	--	--
5 & 6	--	--	--	--	--	--	--	--	--
5 & 7	--	--	--	--	--	--	--	--	--
6 & 7	--	--	--	--	--	--	--	--	--
1 & 2 & 3	32,084	6,101	675	502	1,738	--	397	--	840
1 & 2 & 4	6,069	--	--	--	--	--	--	833	556
1 & 2 & 5	--	--	--	--	--	--	--	--	--
1 & 2 & 6	--	--	--	--	--	--	--	--	--
1 & 2 & 7	2,182	587	--	494	--	559	--	542	--
1 & 3 & 4	7,999	--	--	--	--	--	--	1,274	--
1 & 3 & 5	19,212	--	6,049	--	--	1,332	2,086	5,434	--
1 & 3 & 6	--	--	--	--	--	--	--	--	--
1 & 3 & 7	38,995	9,689	--	--	1,645	--	4,444	1,222	910
1 & 4 & 5	--	--	--	--	--	--	--	--	--
1 & 4 & 6	--	--	--	--	--	--	--	--	--
1 & 4 & 7	2,143	--	--	--	--	--	--	952	--
1 & 5 & 6	--	--	--	--	--	--	--	--	--
1 & 5 & 7	--	--	--	--	--	--	--	--	--
1 & 6 & 7	--	--	--	--	--	--	--	--	--
2 & 3 & 4	4,958	--	--	--	--	--	--	457	418
2 & 3 & 5	1,836	553	806	--	--	--	--	--	--
2 & 3 & 6	--	--	--	--	--	--	--	--	--
2 & 3 & 7	1,355	559	--	--	--	--	--	--	--
2 & 4 & 5	--	--	--	--	--	--	--	--	--
2 & 4 & 6	--	--	--	--	--	--	--	--	--
2 & 4 & 7	--	--	--	--	--	--	--	--	--
2 & 5 & 6	--	--	--	--	--	--	--	--	--
2 & 5 & 7	--	--	--	--	--	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--	--	--	--
3 & 4 & 5	--	--	--	--	--	--	--	--	--
3 & 4 & 6	--	--	--	--	--	--	--	--	--
3 & 4 & 7	--	--	--	--	--	--	--	--	--
3 & 5 & 6	164	--	--	--	--	--	--	164	--
3 & 5 & 7	4,288	1,459	--	--	--	--	2,829	--	--
3 & 6 & 7	--	--	--	--	--	--	--	--	--
4 & 5 & 6	--	--	--	--	--	--	--	--	--
4 & 5 & 7	--	--	--	--	--	--	--	--	--
4 & 6 & 7	--	--	--	--	--	--	--	--	--
5 & 6 & 7	--	--	--	--	--	--	--	--	--
4 or more	10,820	322	--	--	650	--	690	2,009	--
All factors	8,701,917	354,922	385,630	147,709	393,447	66,566	237,764	830,187	29,033

(Table 17 continued on next page)

(Table 17 continued)

Limiting factor	Forest type					
	Oak-hickory	Elm-ash-soft maple	Maple-birch	Aspen	Paper birch	Exotic
1	454,056	367,024	1,948,764	606,167	104,037	5,699
2	--	1,063	2,709	1,306	--	--
3	74,637	22,878	151,286	169,072	29,705	4,775
4	19,340	3,380	21,380	3,725	--	--
5	--	--	--	--	--	--
6	--	--	--	--	--	--
7	58,593	77,220	939,558	204,926	61,307	--
1 & 2	4,117	4,613	2,993	1,408	--	--
1 & 3	40,565	15,750	89,513	79,047	30,007	13,692
1 & 4	2,394	1,310	3,620	805	--	--
1 & 5	--	--	--	--	--	--
1 & 6	--	--	--	--	--	--
1 & 7	24,900	32,710	254,495	124,389	23,812	--
2 & 3	2,727	3,818	2,651	3,682	--	--
2 & 4	898	1,898	2,014	565	--	--
2 & 5	--	--	--	--	--	--
2 & 6	--	--	--	--	--	--
2 & 7	--	--	--	--	--	--
3 & 4	--	--	805	--	--	--
3 & 5	--	--	1,404	2,028	--	4,477
3 & 6	--	--	--	--	--	--
3 & 7	16,535	4,519	20,141	21,499	4,818	--
4 & 5	--	--	--	--	--	--
4 & 6	--	--	--	--	--	--
4 & 7	--	--	7,105	--	--	--
5 & 6	--	--	--	--	--	--
5 & 7	--	--	--	--	--	--
6 & 7	--	--	--	--	--	--
1 & 2 & 3	4,233	6,067	4,196	6,797	--	538
1 & 2 & 4	3,817	--	863	--	--	--
1 & 2 & 5	--	--	--	--	--	--
1 & 2 & 6	--	--	--	--	--	--
1 & 2 & 7	--	--	--	--	--	--
1 & 3 & 4	--	--	6,725	--	--	--
1 & 3 & 5	--	3,675	636	--	--	--
1 & 3 & 6	--	--	--	--	--	--
1 & 3 & 7	1,603	--	--	16,342	3,140	--
1 & 4 & 5	--	--	--	--	--	--
1 & 4 & 6	--	--	--	--	--	--
1 & 4 & 7	--	--	1,191	--	--	--
1 & 5 & 6	--	--	--	--	--	--
1 & 5 & 7	--	--	--	--	--	--
1 & 6 & 7	--	--	--	--	--	--
2 & 3 & 4	--	2,099	1,294	--	690	--
2 & 3 & 5	--	--	477	--	--	--
2 & 3 & 6	--	--	--	--	--	--
2 & 3 & 7	--	--	310	486	--	--
2 & 4 & 5	--	--	--	--	--	--
2 & 4 & 6	--	--	--	--	--	--
2 & 4 & 7	--	--	--	--	--	--
2 & 5 & 6	--	--	--	--	--	--
2 & 5 & 7	--	--	--	--	--	--
2 & 6 & 7	--	--	--	--	--	--
3 & 4 & 5	--	--	--	--	--	--
3 & 4 & 6	--	--	--	--	--	--
3 & 4 & 7	--	--	--	--	--	--
3 & 5 & 6	--	--	--	--	--	--
3 & 5 & 7	--	--	--	--	--	--
3 & 6 & 7	--	--	--	--	--	--
4 & 5 & 6	--	--	--	--	--	--
4 & 5 & 7	--	--	--	--	--	--
4 & 6 & 7	--	--	--	--	--	--
5 & 6 & 7	--	--	--	--	--	--
4 or more	1,696	1,491	2,043	1,371	548	--
All factors	710,111	549,515	3,466,173	1,243,615	258,064	29,181

Table 18.--Growing-stock volume on timberland by forest type, average growing-stock volume and operability class, Michigan, 1980

(In thousand cubic feet)

Forest type and average growing-stock volume per acre (cu.ft. per acre)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack pine					
More than 1000	280,191	3,341	124,141	152,709	--
400-1000	289,833	--	72,918	183,877	33,038
Less than 400	45,375	--	--	18,336	27,039
All classes	615,399	3,341	197,059	354,922	60,077
Red pine					
More than 1000	542,975	1,779	229,359	302,390	9,447
400-1000	135,547	--	29,304	80,450	25,793
Less than 400	10,843	--	--	2,790	8,053
All classes	689,365	1,779	258,663	385,630	43,293
White pine					
More than 1000	259,176	3,133	132,845	123,198	--
400-1000	33,678	--	7,727	20,979	4,972
Less than 400	7,545	--	--	3,532	4,013
All classes	300,399	3,133	140,572	147,709	8,985
Balsam fir					
More than 1000	463,741	--	158,606	303,928	1,207
400-1000	168,618	--	36,767	87,131	44,720
Less than 400	22,701	--	--	2,388	20,313
All classes	655,060	--	195,373	393,447	66,240
White spruce					
More than 1000	94,921	--	39,710	55,211	--
400-1000	17,893	--	--	10,796	7,097
Less than 400	2,653	--	--	559	2,094
All classes	115,467	--	39,710	66,566	9,191
Black spruce					
More than 1000	168,132	--	21,825	146,307	--
400-1000	147,937	--	11,190	90,911	45,836
Less than 400	26,540	--	--	546	25,994
All classes	342,609	--	33,015	237,764	71,830
Northern white-cedar					
More than 1000	1,120,404	8,912	419,761	688,690	3,041
400-1000	250,796	--	55,453	137,667	57,676
Less than 400	28,585	--	--	3,830	24,755
All classes	1,399,785	8,912	475,214	830,187	85,472
Tamarack					
More than 1000	9,835	--	1,720	8,115	--
400-1000	30,647	--	5,547	18,831	6,269
Less than 400	13,574	--	--	2,087	11,487
All classes	54,056	--	7,267	29,033	17,756

(Table 18 continued on next page)

(Table 18 continued)

Forest type and average growing-stock volume per acre (cu.ft. per acre)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Oak-hickory					
More than 1000	1,513,594	48,959	909,063	549,680	5,892
400-1000	447,092	--	236,969	142,943	67,180
Less than 400	53,432	--	--	17,488	35,944
All classes	2,014,118	48,959	1,146,032	710,111	109,016
Elm-ash-soft maple					
More than 1000	894,785	--	492,196	399,382	3,207
400-1000	299,365	--	88,343	129,084	81,938
Less than 400	63,677	--	--	21,049	42,628
All classes	1,257,827	--	580,539	549,515	127,773
Maple-birch					
More than 1000	6,926,413	89,254	3,782,339	3,015,618	39,202
400-1000	1,017,627	--	288,122	431,005	298,500
Less than 400	110,846	--	--	19,550	91,296
All classes	8,054,886	89,254	4,070,461	3,466,173	428,998
Aspen					
More than 1000	2,185,089	26,678	1,269,298	875,999	13,114
400-1000	778,371	--	139,708	352,001	286,662
Less than 400	148,411	--	--	15,615	132,796
All classes	3,111,871	26,678	1,409,006	1,243,615	432,572
Paper birch					
More than 1000	366,876	--	155,137	211,739	--
400-1000	69,070	--	5,934	45,087	18,049
Less than 400	7,573	--	--	1,238	6,335
All classes	443,519	--	161,071	258,064	24,384
Exotic					
More than 1000	18,919	--	8,697	10,222	--
400-1000	20,281	--	1,061	18,421	799
Less than 400	6,261	--	--	538	5,723
All classes	45,461	--	9,758	29,181	6,522
Nonstocked					
More than 1000	--	--	--	--	--
400-1000	--	--	--	--	--
Less than 400	4,000	--	--	--	4,000
All classes	4,000	--	--	--	4,000
All types					
More than 1000	14,845,051	182,056	7,744,697	6,843,188	75,110
400-1000	3,706,755	--	979,043	1,749,183	978,529
Less than 400	552,016	--	--	109,546	442,470
All classes	19,103,822	182,056	8,723,740	8,701,917	1,496,109

Table 19.--Growing-stock volume on timberland by forest type, stand-age class and operability class, Michigan, 1980

(In thousand cubic feet)

Forest type and stand-age class (years)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack pine					
less than 21	49,121	--	--	5,790	43,331
21-40	159,612	--	42,341	100,525	16,746
41-60	300,594	--	109,321	191,273	--
61-80	88,203	3,341	43,905	40,957	--
81-100	15,544	--	--	15,544	--
101-120	1,492	--	1,492	--	--
More than 120	833	--	--	833	--
All ages	615,399	3,341	197,059	354,922	60,077
Red pine					
less than 21	50,244	--	2,569	10,508	37,167
21-40	415,825	--	169,749	239,950	6,126
41-60	99,384	1,779	46,935	50,670	--
61-80	54,031	--	13,110	40,921	--
81-100	42,582	--	20,974	21,608	--
101-120	25,749	--	5,326	20,423	--
More than 120	1,550	--	--	1,550	--
All ages	689,365	1,779	258,663	385,630	43,293
White pine					
less than 21	7,559	--	--	--	7,559
21-40	12,616	--	1,374	9,816	1,426
41-60	37,543	--	27,492	10,051	--
61-80	107,813	3,133	72,201	32,479	--
81-100	79,455	--	25,545	53,910	--
101-120	21,236	--	--	21,236	--
More than 120	34,177	--	13,960	20,217	--
All ages	300,399	3,133	140,572	147,709	8,985
Balsam fir					
less than 21	48,241	--	--	--	48,241
21-40	87,345	--	21,359	47,987	17,999
41-60	270,635	--	75,396	195,239	--
61-80	132,163	--	55,732	76,431	--
81-100	60,547	--	19,961	40,586	--
101-120	34,691	--	9,076	25,615	--
More than 120	21,438	--	13,849	7,589	--
All ages	655,060	--	195,373	393,447	66,240
White spruce					
less than 21	8,554	--	--	--	8,554
21-40	21,503	--	2,181	18,685	637
41-60	31,775	--	15,804	15,971	--
61-80	16,929	--	5,880	11,049	--
81-100	15,318	--	4,045	11,273	--
101-120	17,484	--	7,896	9,588	--
More than 120	3,904	--	3,904	--	--
All ages	115,467	--	39,710	66,566	9,191

(Table 19 continued on next page)

(Table 19 continued)

Forest type and stand-age class (years)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Black spruce					
less than 21	41,729	--	--	5,081	36,648
21-40	115,261	--	--	82,705	32,556
41-60	84,946	--	15,819	66,876	2,251
61-80	54,637	--	5,447	48,815	375
81-100	11,643	--	--	11,643	--
101-120	17,627	--	8,374	9,253	--
More than 120	16,766	--	3,375	13,391	--
All ages	342,609	--	33,015	237,764	71,830
Northern white-cedar					
less than 21	28,487	--	788	1,110	26,589
21-40	80,697	--	9,466	21,477	49,754
41-60	204,354	--	83,551	111,674	9,129
61-80	356,952	--	117,790	239,162	--
81-100	330,488	--	134,344	196,144	--
101-120	201,947	3,645	61,113	137,189	--
More than 120	196,860	5,267	68,162	123,431	--
All ages	1,399,785	8,912	475,214	830,187	85,472
Tamarack					
less than 21	10,207	--	1,986	--	8,221
21-40	7,756	--	--	--	7,756
41-60	15,163	--	1,988	11,396	1,779
61-80	11,387	--	1,720	9,667	--
81-100	5,727	--	1,573	4,154	--
101-120	2,074	--	--	2,074	--
More than 120	1,742	--	--	1,742	--
All ages	54,056	--	7,267	29,033	17,756
Oak-hickory					
less than 21	104,612	--	1,551	--	103,061
21-40	115,010	--	62,108	46,947	5,955
41-60	590,410	12,070	343,682	234,658	--
61-80	531,250	13,277	289,295	228,678	--
81-100	331,055	13,694	206,424	110,937	--
101-120	269,969	9,918	198,652	61,399	--
More than 120	71,812	--	44,320	27,492	--
All ages	2,014,118	48,959	1,146,032	710,111	109,016
Elm-ash-soft maple					
less than 21	103,151	--	--	--	103,151
21-40	165,187	--	54,552	87,661	22,974
41-60	268,289	--	150,333	116,308	1,648
61-80	250,948	--	127,106	123,842	--
81-100	230,330	--	145,273	85,057	--
101-120	148,734	--	66,129	82,605	--
More than 120	91,188	--	37,146	54,042	--
All ages	1,257,827	--	580,539	549,515	127,773

(Table 19 continued on next page)

(Table 19 continued)

Forest type and stand-age class (years)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Maple-birch					
less than 21	365,842	--	--	--	365,842
21-40	613,448	--	260,134	290,750	62,564
41-60	2,537,651	8,532	1,380,192	1,148,335	592
61-80	1,378,530	7,050	745,877	625,603	--
81-100	1,488,227	38,004	814,677	635,546	--
101-120	1,045,344	28,878	575,977	440,489	--
More than 120	625,844	6,790	293,604	325,450	
All ages	8,054,886	89,254	4,070,461	3,466,173	428,998
Aspen					
less than 21	399,191	--	--	6,553	392,638
21-40	492,072	--	175,521	279,316	37,235
41-60	1,265,178	11,485	676,813	574,181	2,699
61-80	629,367	7,356	366,873	255,138	--
81-100	223,996	7,837	127,906	88,253	--
101-120	88,025	--	61,893	26,132	--
More than 120	14,042	--	--	14,042	--
All ages	3,111,871	26,678	1,409,006	1,243,615	432,572
Paper birch					
less than 21	23,284	--	--	4,567	18,717
21-40	34,878	--	7,523	21,688	5,667
41-60	200,530	--	76,273	124,257	--
61-80	137,939	--	52,381	85,558	--
81-100	31,230	--	17,397	13,833	--
101-120	5,407	--	2,966	2,441	--
More than 120	10,251	--	4,531	5,720	--
All ages	443,519	--	161,071	258,064	24,384
Exotic					
less than 21	4,665	--	--	--	4,665
21-40	28,651	--	1,061	25,733	1,857
41-60	12,145	--	8,697	3,448	--
61-80	--	--	--	--	--
81-100	--	--	--	--	--
101-120	--	--	--	--	--
More than 120	--	--	--	--	--
All ages	45,461	--	9,758	29,181	6,522
Nonstocked					
less than 21	1,353	--	--	--	1,353
21-40	657	--	--	--	657
41-60	1,540	--	--	--	1,540
61-80	--	--	--	--	--
81-100	450	--	--	--	450
101-120	--	--	--	--	--
More than 120	--	--	--	--	--
All ages	4,000	--	--	--	4,000
All types					
less than 21	1,246,240	--	6,894	33,609	1,205,737
21-40	2,350,518	--	807,369	1,273,240	269,909
41-60	5,920,137	33,866	3,012,296	2,854,337	19,638
61-80	3,750,149	34,157	1,897,317	1,818,300	375
81-100	2,866,592	59,535	1,518,119	1,288,488	450
101-120	1,879,779	42,441	998,894	838,444	--
More than 120	1,090,407	12,057	482,851	595,499	--
All ages	19,103,822	182,056	8,723,740	8,701,917	1,496,109

Table 20.--Growing-stock volume on timberland by forest type, ownership class and operability class, Michigan, 1980

(In thousand cubic feet)

Forest type and ownership class	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Jack Pine					
National Forest	202,335	--	59,900	122,841	19,594
Other federal	5,824	--	1,045	3,852	927
Indian	--	--	--	--	--
State	252,569	--	91,220	138,920	22,429
County and municipal	14,346	--	1,850	8,820	3,676
Forest industry	11,779	--	4,094	7,685	--
Farmer	18,948	--	9,322	6,756	2,870
Miscellaneous private	109,598	3,341	29,628	66,048	10,581
All owners	615,399	3,341	197,059	354,922	60,077
Red pine					
National Forest	350,707	--	157,710	161,527	31,470
Other federal	418	--	--	418	--
Indian	--	--	--	--	--
State	164,744	1,779	58,719	100,052	4,194
County and municipal	13,147	--	5,507	7,434	206
Forest industry	6,114	--	845	5,269	--
Farmer	54,696	--	6,306	47,003	1,387
Miscellaneous private	99,539	--	29,576	63,927	6,036
All owners	689,365	1,779	258,663	385,630	43,293
White pine					
National Forest	49,596	--	30,812	18,784	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	76,491	--	33,615	36,079	6,797
County and municipal	--	--	--	--	--
Forest industry	34,345	--	7,339	27,006	--
Farmer	33,273	3,133	18,028	10,506	1,606
Miscellaneous private	106,694	--	50,778	55,334	582
All owners	300,399	3,133	140,572	147,709	8,985
Balsam fir					
National Forest	141,126	--	9,959	126,672	4,495
Other federal	4,331	--	2,589	1,742	--
Indian	--	--	--	--	--
State	126,275	--	50,369	62,534	13,372
County and municipal	2,821	--	1,652	--	1,169
Forest industry	126,324	--	35,509	69,850	20,965
Farmer	40,598	--	16,009	19,197	5,392
Miscellaneous private	213,585	--	79,286	113,452	20,847
All owners	655,060	--	195,373	393,447	66,240
White spruce					
National Forest	--	--	--	--	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	24,736	--	10,939	10,358	3,439
County and municipal	2,264	--	--	--	2,264
Forest industry	22,254	--	6,065	15,552	637
Farmer	12,056	--	7,949	4,107	--
Miscellaneous private	54,157	--	14,757	36,549	2,851
All owners	115,467	--	39,710	66,566	9,191

(Table 20 continued on next page)

(Table 20 continued)

Forest type and ownership class	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Black spruce					
National Forest	143,389	--	8,570	127,539	7,280
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	85,832	--	12,587	44,692	28,553
County and municipal	1,670	--	--	1,228	442
Forest industry	40,246	--	4,830	22,531	12,885
Farmer	12,807	--	3,206	4,456	5,145
Miscellaneous private	58,665	--	3,822	37,318	17,525
All owners	342,609	--	33,015	237,764	71,830
Northern white-cedar					
National Forest	87,431	--	13,447	70,764	3,220
Other federal	--	--	--	--	--
Indian	694	--	--	--	694
State	390,409	3,645	148,010	215,433	23,321
County and municipal	10,594	--	--	9,817	777
Forest industry	243,875	--	60,608	172,336	10,931
Farmer	222,507	--	83,477	118,897	20,133
Miscellaneous private	444,275	5,267	169,672	242,940	26,396
All owners	1,399,785	8,912	475,214	830,187	85,472
Tamarack					
National Forest	--	--	--	--	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	19,673	--	3,293	10,161	6,219
County and municipal	--	--	--	--	--
Forest industry	10,721	--	--	6,522	4,199
Farmer	4,976	--	1,988	2,300	688
Miscellaneous private	18,686	--	1,986	10,050	6,650
All owners	54,056	--	7,267	29,033	17,756
Oak-hickory					
National Forest	202,972	--	133,281	61,158	8,533
Other federal	719	--	--	--	719
Indian	--	--	--	--	--
State	371,821	4,197	203,388	136,800	27,436
County and municipal	15,631	--	4,145	9,508	1,978
Forest industry	16,012	--	6,048	9,964	--
Farmer	463,046	23,618	229,411	191,433	18,584
Miscellaneous private	943,917	21,144	569,759	301,248	51,766
All owners	2,014,118	48,959	1,146,032	710,111	109,016
Elm-ash-soft maple					
National Forest	53,635	--	21,794	31,841	--
Other federal	656	--	--	656	--
Indian	1,205	--	--	1,205	--
State	196,038	--	96,107	77,083	22,848
County and municipal	20,285	--	15,621	2,813	1,851
Forest industry	117,587	--	51,326	56,432	9,829
Farmer	374,883	--	199,957	137,361	37,565
Miscellaneous private	493,538	--	195,734	242,124	55,680
All owners	1,257,827	--	580,539	549,515	127,773

(Table 20 continued on next page)

(Table 20 continued)

Forest type and ownership class	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Maple-birch					
National Forest	1,082,052	--	354,232	720,035	7,785
Other federal	2,106	--	1,938	--	168
Indian	24,990	--	18,805	6,185	--
State	1,048,521	5,013	528,028	440,942	74,538
County and municipal	75,867	--	32,645	41,604	1,618
Forest industry	1,567,794	19,175	774,070	714,849	59,700
Farmer	1,473,057	46,063	787,368	511,140	128,486
Miscellaneous private	2,780,499	19,003	1,573,375	1,031,418	156,703
All owners	8,054,886	89,254	4,070,461	3,466,173	428,998
Aspen					
National Forest	421,622	--	169,154	197,725	54,743
Other federal	4,123	--	--	4,123	--
Indian	10,049	--	9,950	--	99
State	666,536	--	311,444	240,174	114,918
County and municipal	27,358	--	9,126	14,321	3,911
Forest industry	170,273	--	65,361	75,396	29,516
Farmer	521,312	12,182	257,141	202,256	49,733
Miscellaneous private	1,290,598	14,496	586,830	509,620	179,652
All owners	3,111,871	26,678	1,409,006	1,243,615	432,572
Paper birch					
National Forest	52,358	--	1,432	50,926	--
Other federal	2,003	--	--	2,003	--
Indian	--	--	--	--	--
State	112,035	--	60,176	49,256	2,603
County and municipal	1,912	--	--	--	1,912
Forest industry	71,798	--	20,372	47,278	4,148
Farmer	52,547	--	15,337	31,687	5,523
Miscellaneous private	150,866	--	63,754	76,914	10,198
All owners	443,519	--	161,071	258,064	24,384
Exotic					
National Forest	--	--	--	--	--
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	--	--	--	--	--
County and municipal	--	--	--	--	--
Forest industry	--	--	--	--	--
Farmer	14,759	--	--	14,487	272
Miscellaneous private	30,702	--	9,758	14,694	6,250
All owners	45,461	--	9,758	29,181	6,522
Nonstocked					
National Forest	127	--	--	--	127
Other federal	--	--	--	--	--
Indian	--	--	--	--	--
State	1,825	--	--	--	1,825
County and municipal	--	--	--	--	--
Forest industry	119	--	--	--	119
Farmer	--	--	--	--	--
Miscellaneous private	1,929	--	--	--	1,929
All owners	4,000	--	--	--	4,000
All types					
National Forest	2,787,350	--	960,291	1,689,812	137,247
Other federal	20,180	--	5,572	12,794	1,814
Indian	36,938	--	28,755	7,390	793
State	3,537,505	14,634	1,607,895	1,562,484	352,492
County and municipal	185,895	--	70,546	95,545	19,804
Forest industry	2,439,241	19,175	1,036,467	1,230,670	152,929
Farmer	3,299,465	84,996	1,635,499	1,301,586	277,384
Miscellaneous private	6,797,248	63,251	3,378,715	2,801,636	553,646
All owners	19,103,822	182,056	8,723,740	8,701,917	1,496,109

Table 21.--Growing-stock volume on timberland by distance from major wood-using center and operability class, Michigan, 1980

(In thousand cubic feet)

Wood-using center and distance (miles)	All classes	Operability class			
		I - Good	II - Medium	III - Poor	IV - Sapling-seedling and nonstocked
Alpena					
Less than 20	263,338	--	116,485	107,311	39,542
20-50	1,179,547	2,839	433,623	605,551	137,534
More than 50	17,660,937	179,217	8,173,632	7,989,055	1,319,033
Brighton					
Less than 20	156,398	9,918	76,413	62,132	7,935
20-50	509,098	10,822	282,131	168,582	47,563
More than 50	18,438,326	161,316	8,365,196	8,471,203	1,440,611
Cadillac					
Less than 20	542,012	3,510	288,805	207,608	42,089
20-50	2,270,991	23,531	1,123,356	905,910	218,194
More than 50	16,290,819	155,015	7,311,579	7,588,399	1,235,826
Escanaba					
Less than 20	336,282	1,430	122,410	183,075	29,367
20-50	1,951,115	22,094	652,882	1,130,884	145,255
More than 50	16,816,425	158,532	7,948,448	7,387,958	1,321,487
Filer City					
Less than 20	286,396	--	130,948	139,798	15,650
20-50	1,370,899	10,701	721,111	533,280	105,807
More than 50	17,446,527	171,355	7,871,681	8,028,839	1,374,652
Gaylord-Grayling					
Less than 20	535,373	2,839	291,323	188,991	52,220
20-50	2,458,513	15,475	1,209,706	1,015,056	218,276
More than 50	16,109,936	163,742	7,222,711	7,497,870	1,225,613
Iron Mountain					
Less than 20	290,921	2,791	145,933	115,440	26,757
20-50	1,975,448	18,557	762,074	1,002,233	192,584
More than 50	16,837,453	160,708	7,815,733	7,584,244	1,276,768
L'Anse					
Less than 20	880,863	--	506,903	342,452	31,508
20-50	3,105,368	2,256	1,490,762	1,466,362	145,988
More than 50	15,117,591	179,800	6,726,075	6,893,103	1,318,613
Manistique					
Less than 20	343,351	2,176	106,004	213,525	21,646
20-50	1,836,338	10,114	605,941	1,102,430	117,853
More than 50	16,924,133	169,766	8,011,795	7,385,962	1,356,610
Midland					
Less than 20	189,476	--	82,012	80,674	26,790
20-50	1,087,231	30,613	531,671	392,105	132,842
More than 50	17,827,115	151,443	8,110,057	8,229,138	1,336,477
Muskegon					
Less than 20	237,465	--	142,997	69,227	25,241
20-50	852,770	18,966	475,802	285,860	72,142
More than 50	18,013,587	163,090	8,104,941	8,346,830	1,398,726
Newberry					
Less than 20	651,759	5,621	179,001	393,154	73,983
20-50	1,529,971	9,915	395,574	1,028,521	95,961
More than 50	16,922,092	166,520	8,149,165	7,280,242	1,326,165
Ontonagon					
Less than 20	507,389	--	300,015	186,701	20,673
20-50	2,253,904	9,774	1,057,121	1,098,607	88,402
More than 50	16,342,529	172,282	7,366,604	7,416,609	1,387,034
Otsego					
Less than 20	261,964	--	185,970	51,844	24,150
20-50	648,973	17,897	345,850	217,095	68,131
More than 50	18,192,885	164,159	8,191,920	8,432,978	1,403,828
West Branch					
Less than 20	508,088	7,308	222,235	223,959	54,586
20-50	1,978,183	18,013	848,960	874,459	236,751
More than 50	16,617,551	156,735	7,652,545	7,603,499	1,204,772
Closest wood-using center					
Less than 20	5,991,075	35,593	2,897,454	2,565,891	492,137
20-50	11,687,390	125,738	5,085,450	5,589,322	886,880
More than 50	1,425,357	20,725	740,836	546,704	117,092

Hansen, Mark H.; Hahn, Jerold T.
1987. Operability and location of Michigan's timber resource. Gen. Tech. Rep. NC-116. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 41 p.

Operability is the ease or difficulty of managing or harvesting timber because of physical conditions in the stand or on the site. Data collected during the 1980 Michigan Statewide forest inventory were used to examine operability of the timber resource based on seven operability components.

KEY WORDS: Management opportunities, forest inventory, prime forest land, harvesting, accessibility.